VOL. III FEBRUARY 1952 NO. 2

UNITED STATES ARMED FORCES MEDICAL JOURNAL

Published Monthly by the Armed Forces Medical Publication Agency, Department of Defense

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THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY THE DIRECTOR OF THE BUREAU OF THE BUDGET, OCT. 19, 1949

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1952

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C.

Foreword

The UNITED STATES ARMED FORCES MEDICAL JOURNAL represents the unification of the BULLETIN OF THE UNITED STATES ARMY MEDICAL DEPARTMENT and the UNITED STATES NAVAL MEDICAL BULLETIN. This joint periodical is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense.

The Chairman of the Armed Forces Medical Policy Council and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this JOURNAL.

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Table of Contents

	Page
Manual Artificial Respiration—*D. B. Dill*	171
Chondromalacia of the Patella—*Chalmers R. Carr and John W. Howard*	185
The Use of Cortisone and ACTH in Treating Reactions to Penicillin—*Nestor M. Hensler, Otto A. Wurl, and James O. Gillespie*	199
Observations on Essentially Normal Young Men Treated With ACTH and Cortisone: I. Effects on Glucose Metabolism—*Saul B. Appel and Kenneth D. Orr*	207
Chronic Granuloma Following Wound Contamination by Beryllium Silicate—*Orland G. Davies, Jr.*	221
Scientific Award	224
History and Symbolism of the Naval Medical Corps Insignia—*Daniel G. Miller*	225
Hemorrhage From the Nasopharynx—*Edgar L. Olson*	239
The Psychiatric Consultation—*Warren J. Barker*	243
Multiple Laceration of the Auricle—*George M. Cazan, Jr.*	253
Medical Service in the Air Defense Command—*Arthur J. Donneson*	263
Combined Streptomycin-Tuberculin Therapy in Pulmonary Tuberculosis: Methods of Treatment—*Eugene C. Jacobs and Joseph R. Vivas*	267
Public Information in the Army Medical Service—*Francis C. Nelson*	275
Articles by Personnel of the Medical Services of the Armed Forces Published in Other Journals	280
Cyst of the Pancreas Associated With Diabetes Mellitus—*Clyde W. Norman*	281
An Outbreak of Q Fever: I. Clinical Study—*Francis X. Fellers*	287
Chemical and Biologic Studies on DDT Resistance of Lice—*Herbert C. Barnett and Edward C. Knoblock*	297
Neuropathy Caused by Intramuscular Injection—*David J. LaFia*	305
Persistent Trismus During Ether Anesthesia—*William W. Montgomery*	309

Page

The Treatment of Congenital Megacolon—*Elmore M. Aronstam* 311

Diabetic Lipemia Retinalis—*Rudolph P. Nadbath and Louis Z. Fauteux, Jr.* 319

Incidence of Amebiasis in Korean Veterans—*Ryle A. Radke* 323

BOOKS RECEIVED 325

BOOK REVIEWS 197

198, 220, 238, 241, 242, 251, 252, 266, 286, 295, 296, 304, 308, 317, 318, 324, 329

OFFICE OF THE SECRETARY OF DEFENSE
ARMED FORCES MEDICAL POLICY COUNCIL
WASHINGTON 25, D.C.

MEMO: Personnel of the Medical Services of the United States Armed Forces

During my visit last fall to the military medical installations in the Far East and European Commands, I was especially interested in the number of professional medical groups which were organized informally in some of the more remote areas. These groups met regularly to discuss problems in the medical and health fields. Based on these observations and from my personal experience during World War II, I believe that such groups play an important role in the three medical services. Not only do they provide a forum for the exchange of ideas and information, but also they serve as a medium through which all concerned can understand the numerous local problems and determine what can be done to solve them.

These organizations are of particular benefit in the field where medical officers have little or no opportunity to participate in the conferences held regularly under the auspices of the military hospitals. Discussions of this type among professional groups in the remote areas cannot help but result in the better understanding of new developments in the field of medicine as well as improved technics in the field of surgery. Increased knowledge results in better medical care for the patient.

Group association and stimulated medical thinking play an important role in the morale and efficiency of medical officers, and high morale is essential in providing the superior quality of medical service for which each medical officer is responsible. I cannot recommend too strongly the organization of medical groups in areas where they do not already exist.

W. Randolph Lovelace, II, M. D.
Chairman

Manual Artificial Respiration

D. B. Dill, *Ph. D.* (1)

IN January 1950 the Secretary of Defense requested the medical services of the Armed Forces to revise the training manuals on the treatment of casualties from chemical warfare agents. A committee of three officers was assigned this responsibility. Because the need for artificial respiration in nerve-gas casualties had been clearly recognized, as was announced in June 1950 (2), the committee decided that methods for manual artificial respiration should be included in the manual and proceeded to review the evidence on which their decision was to rest. Their review of the literature revealed doubts about the Schafer prone pressure method, almost universally used in this country. Comroe and Dripps (3) had published observations on patients which indicated that a higher pulmonary ventilation could be obtained in a "push-pull" method (the Eve tilting method) than in the Schafer method which depends on "push" alone. In 1947 the Council on Physical Medicine of the American Medical Association, at the request of the American Red Cross, reviewed the problem and reported that the prone pressure method was inferior to certain other methods, but recommended that further study be made before selecting a method to be adopted.

In September 1950 a meeting was held at the Army Chemical Center. The medical services of the Armed Forces were represented by officers familiar with design and procurement of equipment and by the officers responsible for research and development as related to equipment and to methods of treatment. A group of physiologists which included outstanding experts in the field of respiration participated. Representatives of the Red Cross and 7 equipment manufacturers also took part. Although 2 push-pull methods of artificial respiration (4-6) were reported to have merit, further research was deemed necessary. With the support of the

(1) Scientific Director, Chemical Corps Medical Laboratories, Army Chemical Center, Md.

(2) Wood, J. R.: Medical problems in chemical warfare. J. A. M. A. 144: 606-609, Oct. 21, 1950.

(3) Comroe, J. H., Jr., and Dripps, R. D.: Artificial respiration. J. A. M. A. 130: 381-383, Feb. 16, 1946.

(4) Nielsen, H.: Method of resuscitation. Ugesk. f. laeger. 94: 1201-1203, Dec. 15, 1932.

(5) Treatment of Chemical Warfare Casualties. TM 8-285, NAVMED P-1328, AFM 160-12. Departments of the Army, the Navy, and the Air Force. August 1951.

(6) Wood, J. R.; Dickens, P. F., Jr.; Rizzolo, J.; and Bayliss, M. W.: Treatment of nerve-gas casualties. U. S. Armed Forces M. J. 2: 1609-1617, Nov. 1951.

Armed Forces several potential investigators were invited to a planning meeting in Washington on 8 November. I was asked to preside at this meeting and to act as coordinator of the research program to be initiated. Developments during the next year illustrate the potentialities of close collaboration between military research agencies and nonmilitary laboratories.

THE RESEARCH PROGRAM

At the meeting of 8 November 5 methods for manual artificial respiration were considered. These included one "push" method (Schafer) and four "push-pull" methods. In one of these, the Silvester, the victim is supine; in the others he is prone. Brief descriptions of these methods adapted from Gordon, Fainer, and Ivy *(7)* follow:

Schafer (prone pressure) method. The patient is placed in the prone position with his arms extended and his face to one side. Pressure is exerted with the operator's hands close together on the lower portion of the patient's thorax. This causes active expiration; when the hands are removed inspiration occurs because of elastic recoil.

Silvester method. The patient is placed in the supine position with his arms at his sides and his forearms and hands on the lower part of his thorax. His arms are raised, straightened, and extended over his head to effect active inspiration. His hands are then returned to their original position and pressure is exerted on his thorax to produce active expiration.

Back-pressure hip-lift (hip-lift back-pressure, hip-lift prone-pressure, or *Schafer-Emerson-Ivy and Thompson) method.* With the patient prone, lifting and lowering his hips is alternated with pressure exerted on the lower part of his thorax. This method was described by Thompson *(8)* who used it for 8 hours on a paralyzed poliomyelitis victim, the Schafer method having proved inadequate.

Back-pressure hip-roll method. This is a variant of the back-pressure hip-lift method described above. The patient is grasped at the distant hip and rolled onto the operator's knee.

Back-pressure arm-lift (Nielsen, Holger-Nielsen, or *arm-lift back-pressure method.* The patient is placed in the prone position with his hands under his forehead. Pressure is exerted over his midback, just below his shoulder blades to effect expiration. His elbows are then grasped and raised, arching his back enough to relieve the weight on his chest; air is thus sucked into his lungs.

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(7) Gordon, A. S.; Fainer, D. C.; and Ivy, A. C.: Artificial respiration; new method and comparative study of different methods in adults. J. A. M. A. 144: 1455-1464, Dec. 23, 1950.

(8) Thompson, T. C.: Method of artificial respiration especially useful for paralyzed patient. J. A. M. A. 104: 307-309, Jan. 26. 1935.

The above methods were compared using (1) apneic hospital patients, (2) student volunteers, and (3) anesthetized and curarized volunteer subjects (9). As a result the investigators, Dr. Comroe, Karpovich, Gordon, and Whittenberger, agreed in April 1951 that the two methods of choice were the back-pressure arm-lift and the back-pressure hip-lift, the back-pressure arm-lift method being preferred. They emphasized that the success of any method depends on thoroughness of indoctrination and they recommended that the details of the technics for the two recommended methods be given further attention.

Air-flow patterns were to be observed in the two recommended methods as applied to apneic human volunteers. A pedagogic study on a large number of enlisted personnel, using the same two methods and variations of them, was approved. With the help of the U. S. Naval Training Center, Great Lakes, Ill., the two methods of choice were tried out on a large number of naval personnel. All observations were completed within a month of the time the proposal was made—a remarkable record of efficient administration on the part of the Office of Naval Research and of effective collaboration between a group of university scientists and a military training center. On the strength of all the evidence accumulated, including Gordon's highly important blood gas studies on apneic volunteers while manual artificial respiration was being applied, it was unanimously agreed that the back-pressure arm-lift method should be given first preference and the back-pressure hip-lift method, second.

PUBLICATION OF FINDINGS

Following a meeting in June 1951 the investigators set about completing their papers for publication. Abstracts were prepared for presentation at the meeting of the American Physiological Society held in September. A Medical Laboratories Research Report was prepared (10). The completed papers were published together in a single issue of the Journal of Applied Physiology (11-20). A summarizing article for the

(9) Gordon, A. S.; Raymon, F.; Sadove, M.; and Ivy, A. C.: Manual artificial respiration; comparison of effectiveness of various methods on apneic normal adults. J. A. M. A. 144: 1447-1452, Dec. 23, 1950.

(10) Dill, D. B.; Comroe, J. H., Jr.; Whittenberger, J. L.; Gordon, A. S.; and Karpovich, P. V.: Manual artificial respiration. Medical Laboratories Research Report No. 79. Chemical Corps Medical Laboratories, Army Chemical Center, Md., Aug. 1951.

(11) Sadove, M. S.; Gordon, A. S.; Nelson, J. T.; and Ivy, A. C.: Barbiturate-curare-induced apnea for artificial respiration studies on normal adults. J. Appl. Physiol. 4: 403-407, Dec. 1951.

(12) Gordon, A. S.; Affeldt, J. E.; Sadove, M. S.; Raymon, F.; Whittenberger, J. L.; and Ivy, A. C.: Air-flow patterns and pulmonary ventilation during manual artificial respiration on apneic normal adults. J. Appl. Physiol. 4: 408-420, Dec. 1951.

(13) Gordon, A. S.; Prec, O.; Wedell, H.; Sadove, M. S.; Raymon, F.; Nelson, J. T.; and Ivy, A. C.: Circulatory studies during artificial respiration on apneic normal adults. J. Appl. Physiol. 4: 421-438, Dec. 1951.

(14) Gordon, A. S.; Raymon, F.; Sadove, M. S.; Wedell, H.; and Ivy, A. C.: Energy expenditure of operators during manual artificial respiration. J. Appl. Physiol. 4: 439-446, Dec. 1951.

Journal of the American Medical Association *(21)* was prepared. The latter contained conclusions and recommendations with descriptions of the methods of choice.

The conclusions and recommendations found in the Medical Laboratories Research Report *(10)* were approved by the Armed Forces Medical Policy Council on 5 November 1951.

PRESENTATIONS TO NONMILITARY AGENCIES

At a conference held in October under National Research Council auspices and attended by representatives of the Armed Forces, Boy Scouts, Girl Scouts, Y. M. C. A., public utilities, and civilian defense organizations, synopses of the findings of the investigators were presented. This presentation led to the subsequent wide-scale adoption of the back-pressure arm-lift method of artificial respiration. A highly condensed version of the reports interpreted in the light of the ensuing discussion follows.

Dr. Comroe reported observations on 13 apneic patients. As a rule he found that the hip-lift and hip-roll technics, combined with back-pressure, produced the greatest tidal volume. The Silvester, the back-pressure arm-lift, and the Schafer technics followed in that order. He recognized that the hip-lift and hip-roll technics are too exhausting for general use and endorsed the back-pressure arm-lift method as an acceptable compromise in that it produces much more ventilation than the Schafer method, is less exhausting than the hip-lift or hip-roll technics, and does not favor respiratory obstruction as does the Silvester (supine) technic. In his subjects, the back-pressure arm-lift method did not produce hyperventilation as it did in Gordon's series. He urged, therefore, that it be used with a *full* arm lift, with firm pressure over the scapulas (*not* over the shoulders) if it is to achieve adequate pulmonary ventilation in most patients in need of artificial respiration. He had originally suggested that the rhythm be about 14 cycles per minute, but he accepted the others' recommendation that it be about 12 per minute.

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(15) Gordon, A. S.; Star, S.; Meier, F.; Hale, C.; and Ivy, A. C.: Pedagogical and performance factors of manual artificial respiration with naval personnel. J. Appl. Physiol. 4: 447-457, Dec. 1951.

(16) Karpovich, P. V.; Hale, C. J.; and Bailey, T. L.: Pulmonary ventilation in manual artificial respiration. J. Appl. Physiol. 4: 458-466, Dec. 1951.

(17) Karpovich, P. V., and Hale, C. J.: Energy expended in administering artificial respiration. J. Appl. Physiol. 4: 467-471, Dec. 1951.

(18) Karpovich, P. V., and Hale, C. J.: Manual artificial respiration; pedagogical and fatigue factors involved in its use. J. Appl. Physiol. 4: 472-475, Dec. 1951.

(19) Whittenberger, J. L.; Affeldt, J. E.; Goodale, W. T.; and Sarnoff, S. J.: Mechanics of breathing in relation to manual methods of artificial respiration. J. Appl. Physiol. 4: 476-485, Dec. 1951.

(20) Nims, R. G.; Conner, E. H.; Botelho, S. Y.; and Comroe, J. H., Jr.: Comparison of methods for performing manual artificial respiration on apneic patients. J. Appl. Physiol. 4: 486-495, Dec. 1951.

(21) Gordon, A. S.; Sadove, M. S.; Raymon, F.; and Ivy, A. C.: Critical survey of manual artificial respiration. J. A. M. A. 147: 1444-1453, Dec. 8, 1951.

During the discussion one of the representatives questioned the wisdom of giving up the Schafer method in view of the record of its success in saving lives. Dr. Comroe replied that while many lives could be saved by the Schafer method, more could be saved by the recommended methods. He opposed the philosophy of letting well enough alone. Acceptance of such a philosophy would have prevented, for example, the introduction of sulfonamides in the treatment of pneumonia and their replacement in turn with still more effective antibiotics.

Dr. Whittenberger reported observations on 8 apneic patients in which 3 manual methods were compared. In 6 of these patients the cause of apnea was massive intracranial hemorrhage. His results showed more than adequate ventilation with the back-pressure hip-lift method, adequate but somewhat less ventilation with the back-pressure arm-lift method, and slightly less than adequate ventilation with the Schafer method. From analysis of the air flow patterns and comparison of technic with other operators, he concluded that the potential of the back-pressure arm-lift method is not fully utilized *unless the arms are well lifted.*

Considering not only the effectiveness of ventilating the lungs but ease of performance and other factors, he concluded that the back-pressure arm-lift and back-pressure hip-lift methods are equally sound physiologically, the preference going to the former method for practical reasons. The Schafer method is not recommended.

A hospital case he described is of special interest:

> A 66-year-old man was admitted with a history of unconsciousness for 2½ hours. He was alleged to have taken paraldehyde and one barbiturate capsule. He had had several previous admissions for alcoholism, bronchial asthma, and pulmonary emphysema and fibrosis. On admission he was comatose, cyanotic, and apneic. Multiple doses of caffeine, coramine, and picrotoxin had no effect. Artificial respiration was applied to the patient in the sitting position by anterior chest compression. The cyanosis persisted. The patient was then put in the prone position and the hip-lift method applied by 2 men using a sheet under the hips. The cyanosis disappeared in 5 minutes. An additional dose of picrotoxin was then followed by gradual respiratory efforts of the patient. Manual application was continued for 30 minutes. The patient recovered with no apparent sequelas.

Dr. Karpovich paid special attention to fatigue, energy requirement, ease of learning and other pedagogic factors. He also measured pulmonary ventilation when artificial respiration was superimposed on the normal respiration. His measurements showed that the Schafer method gave only about one-half the pulmonary ventilation given by the push-pull methods. The energy requirement was measured on operators of both sexes and on victims of varying body weight. All operators complained that the hip-lift method was most fatiguing. Yet there was no associated

clear-cut difference in the operators' oxygen consumptions. Evidently the fatigue complained of was due to local stresses, especially of the shoulder muscles.

Dr. Karpovich's pedagogic study was done on 2 groups of subjects consisting of 100 boys and 67 young men respectively. The students were divided into small groups and each group was given instruction separately in one session. During another session they were required to execute each method for from 10 to 15 minutes. The order of methods was randomized with the exception of the hip-lift, which was always given at the end of the test. This was done because preliminary investigation showed that the hip-lift was unquestionably most fatiguing and its use before the execution of other methods would have caused an early fatigue and might have affected the experiment. The results led Dr. Karpovich to conclude that from the standpoint of ease of learning and operation the order of increasing difficulty is as follows: Schafer, back-pressure arm-lift, Silvester, back-pressure hip-roll, and back-pressure hip-lift.

Dr. Gordon and his associates induced apnea in 50 normal adults using pentothal sodium and curare, partially supplemented with cyclopropane-oxygen mixtures *(11)*. Working with Whittenberger and Affeldt *(12)* it was found that push-pull manual methods produce a tidal volume about double that given by the Schafer method. A crucial element in the technic of the back-pressure arm-lift method is that the *arms must be raised until firm resistance is met.* In a third and highly significant study, arterial oxygen saturations were obtained *(13)*. In all the push-pull methods oxygenation of arterial blood was adequate. The detailed results on the Schafer and the back-pressure arm-lift methods are found in table 1. Ten trials on 7 subjects were carried out with the Schafer method. In 3 of these (5, 7, and 8) oxygenation was adequate. Second trials were not carried out on subjects 6 and 11 because of alarming cyanosis and the trial on subject 9 was discontinued before blood was drawn for the same reason. On the other hand, oxygenation was adequate in all 11 trials on these 7 subjects when the back-pressure arm-lift was applied.

In the final study Dr. Gordon's group collaborated with Dr. Karpovich's group in evaluating pedagogic and performance factors *(15)*. They concluded as follows:

> "Observations and rating of the performance of methods of manual artificial respiration by 667 Naval recruits and 124 Waves revealed that both the back-pressure arm-lift and variations of the back-pressure hip-lift can be successfully taught to Naval recruits in relatively brief training sessions as used in this test.
>
> "Of these methods, the back-pressure arm-lift surpasses all the variations of the hip method in accuracy of performance, ease of learning—as measured by the need for an amount of correction—and physical ease of performance.

"Among the hip methods, the back-pressure hip-lift, especially when an adjunct is used in its performance, is most easily learned and accurately performed. It is, however, physically harder to do than the hip rolls. Hip methods, unlike the arm method, result in greater fatigue for the operator when the subject is appreciably larger than the operator.

TABLE 1. *Arterial oxygen saturation during trials of manual artificial respiration on anesthetized, curarized normal volunteers*

Subject	Trial	Arterial oxygen saturation (percent)	
		Schafer method	Back-pressure arm-lift method
5	1	85	89
6	1	42	–
	2	*	91
7	1	87	100
	2	–	100
8	1	91	91
	2	–	91
9	1	*	93
	2	–	96
10	1	61	–
	2	50	89
11	1	52	89
	2	*	89

*Discontinued because subject was cyanotic.

"Since these conclusions are based on monitors' ratings it is not surprising that the monitors themselves arrived at much the same judgments. In ranking the methods as easiest to learn, easiest to perform, easiest to correct, most correctly performed and all around best (considering ventilation, fatigue, teachability, and accuracy of performance), the monitors themselves consistently placed the back-pressure arm-lift method first; the back-pressure hip-lift method with adjunct was second, and the back-pressure hip-roll method with adjunct was last; the other two hip methods were always ranked either third or fourth."

After the foregoing evidence was presented and the methods demonstrated there was a general discussion. Nearly everyone agreed with the conclusions reached by the investigators. After the meeting was adjourned the investigators met with a number of National Research Council consultants to draft recommendations. It was agreed that the

rhythm should be about 12 per minute and that the expiratory phase should come first. The back-pressure arm-lift method was accepted as the preferred method. It was recognized, however, that under some circumstances, the back-pressure hip-lift method should be used, especially in case of an arm injury. Dr. Comroe pointed out subsequently that "* * * people in charge of artificial respiration on beaches often have an unlimited supply of individuals who can give artificial respiration in relays (as soon as one gets worn out another can take over). Under such circumstances I think the hip-lift back-pressure method would be the method of choice, and certainly the one that I would want performed on me if I had been the victim of drowning."

Endorsement of the Silvester method was urged by one of the consultants. This method had been one of the first to be ruled out by the investigators; they considered that a supine position increases the danger of the tongue blocking the airway. Gordon et al. (7) in their study of warm corpses gave some attention to this question. In 8 cases a mouthpiece was used with the nostrils closed by a clip. This provided an airtight airway and at the same time permitted the tongue and mandible to remain free. In the back-pressure arm-lift and the back-pressure hip-lift methods there were no failures whereas in the Silvester method the airway was blocked in 4 of the 8 cases. Dr. Comroe subsequently addressed an inquiry to 35 well-known anesthesiologists in this country. He found that "* * * the great majority of them favor the prone position as the position of choice to prevent respiratory obstruction in an unconscious patient. However, a few favor the supine; a few stated that there was no difference between the two positions; and several stated frankly that they did not know. A number of them indicated that there was really no accurate information upon this and their opinion was merely a guess." For the moment, however, it is concluded that the Silvester method should not be used unless circumstances prevent placing the victim in a prone position.

Finally the investigators and consultants endorsed instructions for the two preferred methods adapted from the Medical Laboratories Research Report (10). These, edited to conform to the modifications suggested, follow.

GENERAL PRINCIPLES OF MANUAL ARTIFICIAL RESPIRATION

Time is of prime importance. Seconds count. Do not take time to move the victim to a more satisfactory place; begin at once. Do not delay resuscitation to loosen clothes, warm the victim, nor to apply stimulants. These are secondary to the main purpose of getting air into the victim's lungs.

Begin artificial respiration and continue it rhythmically and uninterrupted until spontaneous breathing starts or the victim is pronounced dead.

As soon as the victim is breathing by himself, or when additional help is available, see that the clothing is loosened (or removed, if wet) and the patient is kept warm, but do not interrupt the rhythmic artificial respiration to accomplish these measures.

If the victim begins to breathe on his own, adjust your timing to assist him. Do not fight his attempts to breathe. Synchronize your efforts with his.

Do not wait for a mechanical resuscitator, but when an approved model is available use it. The important advantages of good mechanical resuscitators are that they require less skill to operate, are not fatiguing, and can furnish 100 percent oxygen. Because a resuscitator need only be applied to the patient's face, it can be used when physical manipulation of the body is impossible or would be harmful, as during surgical procedures, in patients with extensive burns, broken vertebras, ribs, and arms, for victims trapped under debris of excavations, or under overturned vehicles, and during transportation of the victim. Furthermore, some resuscitators signal when the airway is obstructed and provide an aspirator.

BACK-PRESSURE ARM-LIFT METHOD (PREFERRED)

Place the victim in the face-down (prone) position. Bend both his elbows and place one of his hands on the other. Turn his face to one side and place it on his hands.

Quickly sweep your fingers through his mouth to clear out froth and debris and bring his tongue forward.

Kneel at his head on your right (or left) knee. Place your knee close to his arm and just to the side of his head. Place your left (or right) foot near his elbow. If it is more comfortable, kneel on both knees, one on either side of the victim's head.

Place your hands on his midback just below his shoulder blades (fig. 1). Your fingers should be spread, with your thumbs pointed toward and an inch or two away from his spine. Rock forward and allow the weight of the upper part of your body to exert slow, steady even pressure downward on your hands (fig. 2). This forces air out of his lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on his back. Do *not* exert sudden or too much pressure, nor place your hands high on his back or on his shoulder blades.

Release the pressure quickly. This is done by "peeling" your hands from his back without giving any extra push with the release.

Rock backward and allow your hands to come to rest on his arms just above his elbows (fig. 3). Although he may be grasped anywhere along his arms, the position just above his elbows is generally best. As you rock backward, draw the victim's arms upward and toward you. When doing this, do not bend your elbows; keep your arms straight and as you rock

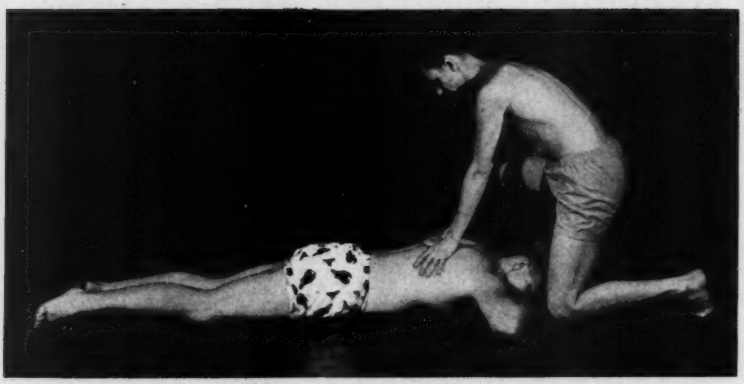

Figure 1. Initial position.

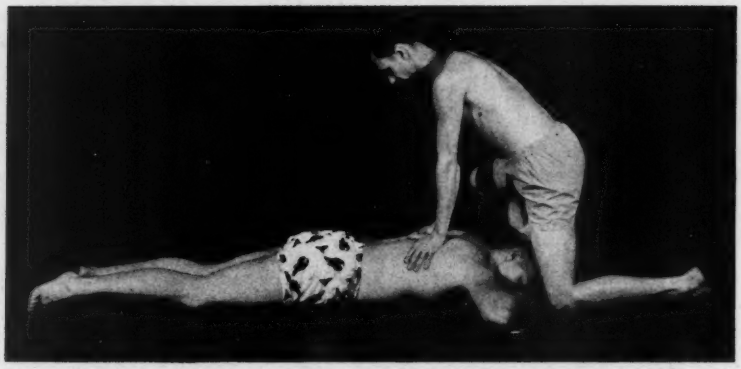

Figure 2. Pressure phase. Note that the operator's arms are straight and nearly vertical.

Figure 3. Positioning the hands on the victim's arms near his elbows.

backward his arms will naturally be drawn upward and toward you. Put enough lift on his arms to feel resistance and tension at his shoulders. The arm lift pulls on his chest muscles, arches his back, and relieves the weight on his chest; air is thus sucked into his lungs (fig. 4).

Carefully replace his arms on the ground. Slide your hands to his midback. You are now ready to repeat the cycle.

Repeat this cycle about 12 times per minute to the rhythm of (1) press—(2) release—(3) lift—(4) release. Each of these phases takes about 1½ seconds, giving a constant, steady, uniform rate, at 5 seconds per cycle.

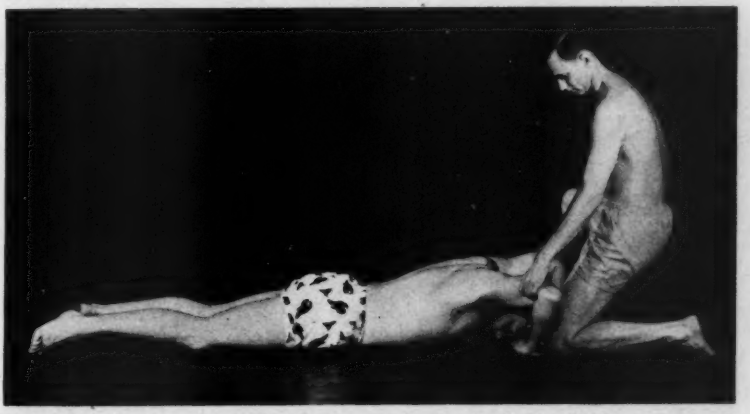

Figure 4. Lift phase. Note that the operator is leaning back with his arms nearly straight and that the victim's arms are raised enough to arch his back and partially raise his chest from the ground.

Remember that either knee, or both knees, may be used; or you may shift knees during the procedure with no break in the steady rhythm. Also note that you rock forward with the back-pressure and backward with the arm-lift. This rocking motion helps keep the rhythm, and adds to the ease of operation.

BACK-PRESSURE HIP-LIFT METHOD (ALTERNATE)

Place the victim in the face-down (prone) position with his elbows bent. Turn his face to one side and rest it on the back of one hand. His other hand is alongside and above his head.

Quickly sweep your fingers through his mouth to clear out froth and debris and bring his tongue forward.

Kneel on your right (or left) knee at the level of his hips. Straddle the victim and place your left (or right) foot on the ground near his opposite hip. Thus your left heel is directly opposite the kneeling knee.

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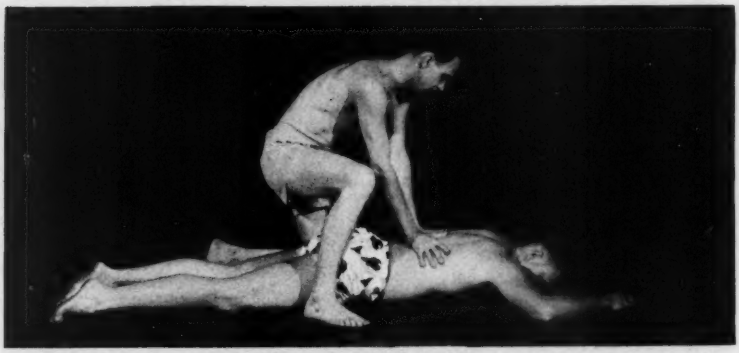

Figure 5. Initial position.

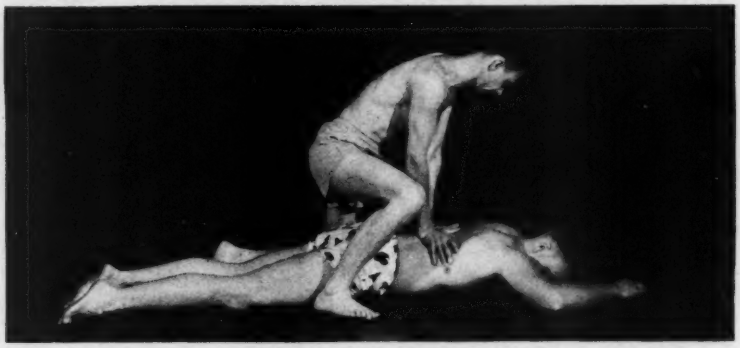

Figure 6. Pressure phase.

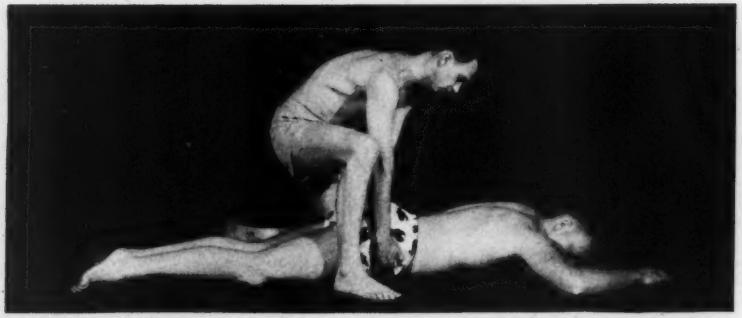

Figure 7. Positioning the hands on the victim's hips.

Place your hands, with the fingers spread, on his midback just below his shoulder blades (fig. 5). Your two thumbs point toward each other and are 1 or 2 inches from his spine, with your fingers pointed outward. Lean forward and allow the weight of the upper part of your body to exert slow, steady, even pressure downward on your hands (fig. 6). This forces air out of his lungs. Your elbows should be kept straight and the pressure exerted almost directly downward. Do not exert sudden nor too much pressure, nor place your hands high on his back nor on his shoulder blades.

Figure 8. Lifting the hips. Note that the operator's arms are straight and that the hips are lifted about 6 inches from the ground.

Release the pressure by quickly removing your hands. This is done by "peeling" them from his back without giving an extra push with the release.

As you release, rock backward and allow your hands to come to rest on his hips. This will be several inches below his waist. *Do not grasp his waist.* Just slip your fingers under his hip bones where they touch the floor (fig. 7).

Lift both hips upward and toward you about 5 inches from the ground (fig. 8). This allows his abdomen to sag downward. His diaphragm descends and air is sucked into his lungs. Be sure to keep your arms straight as you lift. In this way you do the work of lifting with your shoulders and back instead of with your arms. *Do not* bend your elbows as you lift his hips.

Carefully replace his hips on the ground in their original position. Do not just drop them. You are now ready to repeat the cycle.

This cycle should be repeated about 12 times per minute to the rhythm of (1) press—(2) release—(3) lift—(4) release. Each of these phases takes nearly 1½ seconds, giving a constant, steady, uniform rate at about 5 seconds per cycle.

If the knee on which the procedure is begun becomes tired or uncomfortable, it is possible to switch to the opposite knee with practically no break in the steady rhythm. The best time for changing knees is immediately following the press—release phase.

You should continue the method as long as possible. If you become tired, you should continue the back-pressure phase alone, at a faster rate, resuming the hip-lift as soon as possible, or performing a hip-lift after each second, third, or fourth back-pressure, or as often as possible.

If a second person is available, he can take over with practically no break in the rhythm. He does this by coming in on the side opposite where you are kneeling. After one of the lift—release phases he begins the press—release while you move away. He should be in position by the time the next hip-lift phase of the cycle is due.

You must not depend on or spend time seeking any apparatus to sup plement or assist these maneuvers, but if a belt, towel, shirt, or rope is available, it may be passed beneath the hips (*not* beneath the waist) and used for lifting. This adjunct should be grasped near his body as this prevents slipping which may occur if the ends are held. Except for the adjunct, the method is performed as described above.

The back-pressure hip-lift method can be performed from the standing position, but this is not advisable because it may result in back strain to the operator during the lift or excessive pressure on the victim's back during the back-pressure phase.

CONCLUSIONS

The mechanism of action of nerve gases is such that manual artificial respiration will occupy an important role in the treatment of casualties from attacks with such a weapon. Furthermore, a fuller understanding of manual artificial respiration may well result in the saving of many lives in other military operations.

Prior to 1951 there was no adequate experimental basis for choosing methods of manual artificial respiration. Various investigators favored the "push-pull" principle over the Schafer method which depends on elastic recoil for the inspiratory phase.

A research program on manual methods was sponsored by the military medical services. As a result 4 outstanding groups of physiologists have recommended 2 methods, the back-pressure arm-lift method first and the back-pressure hip-lift method second. Instructions for their use are given. These methods were officially adopted by the Armed Forces Medical Policy Council. The outcome illustrates the potentialities of effective collaboration between scientists in universities and scientists and administrators in the Armed Services.

Chondromalacia of the Patella[1]

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THE true frequency of chondromalacia of the patella may be underestimated. Nineteen malacic patellas were found in a series of 60 consecutive knee arthrotomies. The diagnostic criteria are now well established, but there is no unanimity of opinion as to optimum therapy. Our purpose is to add a series to the literature and to recount our immediate end results. Thirteen of our 19 patients had other derangements of the knee with the chondromalacia. Malacia alone was found in 6. Total patellectomy was performed in 10 of these patients; 9 were treated by excising the involved cartilage and smoothing the crater edges.

HISTORICAL

The term chondromalacia was first used by Koenig (4) in 1924. In 1906 Buedinger (5) described the condition as "fissures of the patellar cartilage." In addition to the term chondromalacia, this abnormal softening of the cartilaginous undercovering of the patella has been described as traumatic chondritis, traumatic degeneration, traumatic fibrillous degeneration, traumatic degeneration of the articular cartilage, and traumatic osteochondritis. Apparently the frequency of this softening was little appreciated prior to 1926. Heine (6), in that year, reported a dissection of 2,002 cadavers in which he found that the degenerative changes in the knee joint occurred first and were most marked in the articular surface of the patella. A year later

(1) Read before the Northern California Chapter of the Western Orthopedic Association.

(2) At U. S. Naval Hospital, Oakland, Calif., when this article was written; now at U. S. Naval Hospital, National Naval Medical Center, Bethesda, Md.

(3) With Department of Orthopedic Surgery, U. S. Naval Hospital, Oakland, Calif., when this article was written; now at U. S. Naval Hospital, Portsmouth, Va.

(4) Koenig: Mikroskopische Beobachtungen am Knorpelgewebe mit ultraviolettem Licht. Verhandl. d. phys.-med. Gesellsch. (Sitzungsberichte 10-15). 49: 160-162, 1924.

(5) Buedinger, K.: Ueber ablösung von Gelenkteilen und verwandte Prozesse. Deutsche Ztschr. f. Chir. 84: 311-365, 1906.

(6) Heine, J.: Arthritis deformans. Verchows Arch. f. path. Anat. 260: 521-663, 1926.

Aleman (7) reported 220 arthrotomies, in which he found 33 percent to have a focus of softening in the patellar cartilage. Darrach (8) later found 36 (23 percent) of 157 patients to have degenerative changes in the patellar cartilage. Hilzensauer (9), in 1,000 arthrotomies, reported a smaller incidence. Owre (10) found degenerative changes in the articular cartilage of the patella in 102 cadavers with presumed normal knee joints. In recent years Cave et al. (11) and Soto-Hall (12) reported an incidence of 7 and 18.5 percent respectively. These reports were concerned with patients undergoing arthrotomy in an age group comparable to that reported in this article.

In seeking the best surgical procedure, one must review the evidence for and against total patellectomy. In 1860, Putz (13) removed a patella with an apparently satisfactory result and concluded that the patella was not essential to normal gait. Rynard (14) reported a patient with total patellectomy performed for a fracture of the patella by Althmann in 1890, and stated that the patient recovered full joint function after the operation. Widespread use of this procedure for fractures of the patella coincides with the report of Brooke (15). He reported on 30 patients and stated that "the patella was a vestigial remains and actually a hindrance to complete joint efficiency." Licky (16) repeated these studies and obtained different findings from those of Brooke. He believed that the patella had a levering effect on knee-joint function (1) by improving the angle of application of the quadriceps power, especially as it approached 180 degrees, (2) by acting as a fulcrum, and (3) by holding the tendon away from the central axis of the knee joint. Numerous other writers, notably Tippett (17), Bissell (18), and Dodd (19), reported good functional recovery following total patellectomy in the treatment of fractured patellas. In his report, Bissell stressed the necessity of meticulous suture of the medial expansion

(7) Aleman, O.: Chondromalacia posttraumatica patellae. Acta chir. Scandinav. 63: 149-190, 1928.

(8) Darrach, W.: Internal derangements of knee. Ann. Surg. 102: 129-137, July 1935.

(9) Hilzensauer, K.: Zur Chondropathie der Patella. Arch. f. orthop. u. Unfall-Chir. 36: 614-618, 1936.

(10) Owre, A.: Chondromalacia Patellae. Acta chir. Scandinav. 77: Supplementum 41, 1936.

(11) Cave, E. F.; Rowe, C. R.; and Yee, L. B. K.: Chondromalacia of patella. Surg., Gynec. & Obst. 81: 446-450, Oct. 1945.

(12) Soto-Hall, R.: Traumatic degeneration of articular cartilage of patella. J. Bone & Joint Surg. 27: 426-431, July 1945.

(13) Putz: Quoted by Albert (30).

(14) Rynard, M.: Ablation de la rotule; recuperation rapide des mouvements. Marseille Med. 55: 474-475, June 1, 1918.

(15) Brooke, R.: Treatment of fractured patella by excision. Study of morphology and function. Brit. J. Surg. 24: 733-747, Apr. 1937.

(16) Licky: Quoted by Albert (30).

(17) Tippett, G. O.: Treatment of fractures of the patella by excision. Brit. M. J. 1: 383-384, Feb. 19, 1938.

(18) Bissell, A. H.: Total removal of patella. Am. J. Surg. 40: 486, May 1938.

(19) Dodd, H.: Fractured patella treated by excision of fragments. Lancet 2: 130-131, July 15, 1939.

of the joint capsule, and repair of the traumatic rent in the capsule. Berkheiser *(20)* reported satisfactory results for patellectomy performed for arthritic changes in the knee joint. Wass and Davies *(21)* were less enthusiastic about this operation because a complete return of joint function did not result and a residual quadriceps weakness was present. They recommended the procedure for fractured patellas as superior to other methods of therapy. Additional reports of the foreign literature suggest that, although the procedure is not universally approved, it has been widely applied and is not in disrepute. Because the condition of chondromalacia of the patella is a disabling derangement of the knee joint, one of two surgical procedures is to be used. If total patellectomy gives fair assurance of return to normal function and prevents further attrition in the joint, then its use is justified no matter how radical it may seem at the time.

PATHOGENESIS

Several tenable concepts have been advanced as to the pathogenesis of chondromalacia of the patella. Trauma to the patellar cartilage appears to be the primary factor as expressed by Buedinger *(5)*. Peabody and Walsh *(22)* believed that the condition was of congenital origin. Bennett et al. *(23)* observed that knee joints obtained from patients, whose ages were greater than 20 years, manifested the changes of degenerative arthritis. From this, they concluded that the articular cartilage remained normal for only a short period of time following its complete maturation. Peabody and Walsh *(22)* believed, however, that in the second and third decade of life there is a great reparative capacity in the deep chondral layers. These deep layers have a good blood supply and a great capacity for fibrocartilaginous proliferation from underlying bone. Freund *(24)* believed that normally a joint cartilage requires friction and pressure to remain in a healthy condition. Variations of these normal stimuli, either to a greater or lesser degree than some indeterminate physiologic optimum was thought to be deleterious to the joint cartilage. Mueller *(25)* and Benninghoff *(26)* both demonstrated this by animal experimentation. These experiments

(20) Berkheiser, E. J.: Excision of patella in arthritis of knee joint. J. A. M. A. 113: 2302-2308, Dec. 23, 1939.

(21) Wass, S. H., and Davies, E. R.: Excision of patella for fracture, with remarks on ossification in quadriceps tendon following operation. Guy's Hosp. Rep. 91: 35-57, 1942.

(22) Peabody, C. W., and Walsh, F. P.: Surgery of knee joint derangements. S. Clin. North America 28: 1247-1275, Oct. 1948.

(23) Bennett, G. A.; Waine, H.; and Bauer, W.: Changes in Knee Joint at Various Ages. Commonwealth Fund, New York, N. Y., 1942.

(24) Freund, E.: Joint cartilage under infraphysiologic ultraphysiologic and euphysiologic demands. Arch. Surg. 39: 596-623, Oct. 1939.

(25) Mueller, W.: Experimentelle Untersuchugen uber die Wirkung langdauernder Immobilisierung auf die Gelenke. Ztschr. f. orthop. Chir. 44: 478-488. 1923-1924.

(26) Benninghoff, A.: Experimentelle Untersuchungen über den Einfluss verschiedenartige mechanische Beanspruchung auf den Knorpel (Verhandlungen der anatomischen Gesellschaft). In Anat. Anzeiger, Ergänzungsheft 58: 194-215. 1924.

seemed to substantiate the theory that chondromalacia of the patella was caused by continuous friction under tension. Sundt *(27)* suggested that the primary cause was not injury to the patellar cartilage at all but was injury to the synovial membrane, which in time produced an abnormal type of synovial fluid. Because the articular cartilage is to a large extent nourished by the synovial fluid, an abnormal composition of this fluid would cause nutritional disturbances in the cartilage and lead to its eventual degeneration.

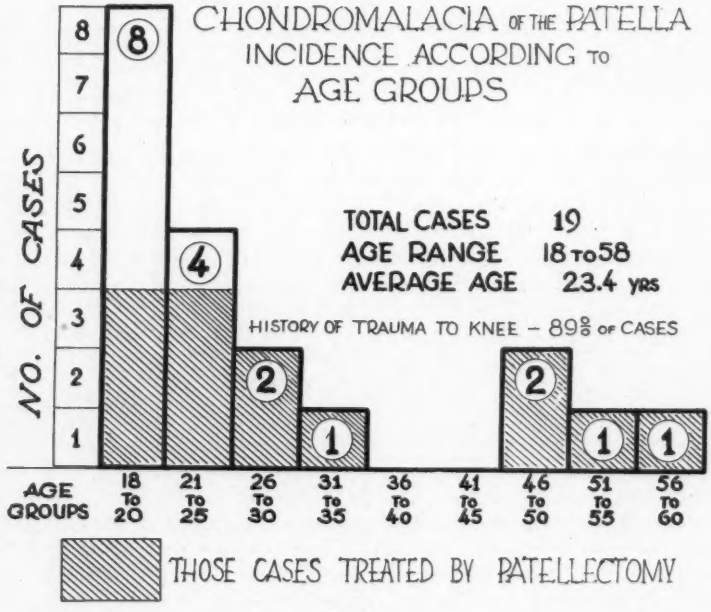

Figure 1.

In our 19 patients, whose ages are shown in figure 1, 17 gave a history of previous trauma to the knee joint. No further cause for this condition need be sought than trauma to a structure, poor in blood supply and with little regenerative power. In the patients in whom a history of definite trauma to the knee joint is absent, the aggregate effect of repeated episodes of mild trauma must have occurred and produced avascular necrosis of the underlying cartilage. The gross pathologic change present in chondromalacia is much different from the change seen with osteochondritis dissecans. In the latter a necrosis of subchondral bone, separation of the bone at one area of the

(27) Sundt, H.: Discussion following presentation of paper by Nils Silferskiöld on chondromalacia of the patella. Acta orthop. Scandinav. 9: 214-229, 1938.

cortex, and gradual degeneration and necrosis of the cartilage attached to the separated fragment occur. In chondromalacia, softening of the joint surface occurs first and sections taken through these areas will show a death of chondrocytes in the superficial layers and preservation of normal cartilage in deeper layers, with no involvement of the underlying bone structure. In the early lesions, fibrillation of the superficial layer of the cartilage is clearly evident. The deeper layer of cartilage becomes edematous, swollen, and contains relatively few chondrocytes. As the cartilage cells degenerate, they increase in size and appear to become piled up. Later they disappear and the empty lacunas of the cartilage become evident (figure 2). Although the cartilage is progressively reduced in thickness, the subchondral bone shows no great change until fully exposed. On exposure the marrow of the bone may exhibit marked degrees of fibrous proliferation.

There also may be evidence of abnormal osteoblastic and osteoclastic activity at the margins of the eroded area, with an occasional island of cartilage found in the marrow spaces of the subchondral bone. These malacic areas in the living knee joint are noted when the articular cartilage has lost its normal white to blue-white glistening translucent appearance and has become yellow, opaque, and soft. When a blunt instrument or the finger tip is passed over the involved area, the cartilage is felt to be soft and boggy, imparting the sensation that it might be detached from the subchondral bone. Fibrillation of the margins of the softened area is seen.

As the degeneration progresses, fissures and cracks appear in the cartilage and fragments may break off to form loose bodies in the joint or may remain as additional small fibrillated tufts. In the advanced cases, the subchondral bone may be exposed to the joint surface. Frequently, especially in chronic cases a similar "mirror" lesion may exist on the adjacent femoral condyle. When these two lesions pass over each other with joint motion, a grating sensation is produced. The feeling of insecurity frequently elicited as the main subjective symptom may be due to these lesions. In some cases small marginal osteophytes appear about the border of the patella relatively early in the disease. In all cases the synovial membrane of the joint shows evidence of long standing inflammation with hyperemia, thickening, and villose formation. Bronitsky *(28)* found the earliest detectable and most frequent site for these lesions to be the medial facet of the patella; next in frequency was the center of the patella; and least frequent, the lateral facet. Only in more advanced cases was involvement of the entire surface of the patella noted. In our experience, with the exception of those patients in whom the entire patella was involved, an area extending transversely across the center of the patella was involved in each instance.

(28) Bronitsky, J.: Chondromalacia patellae. J. Bone & Joint Surg. 29: 931-945, Oct. 1947.

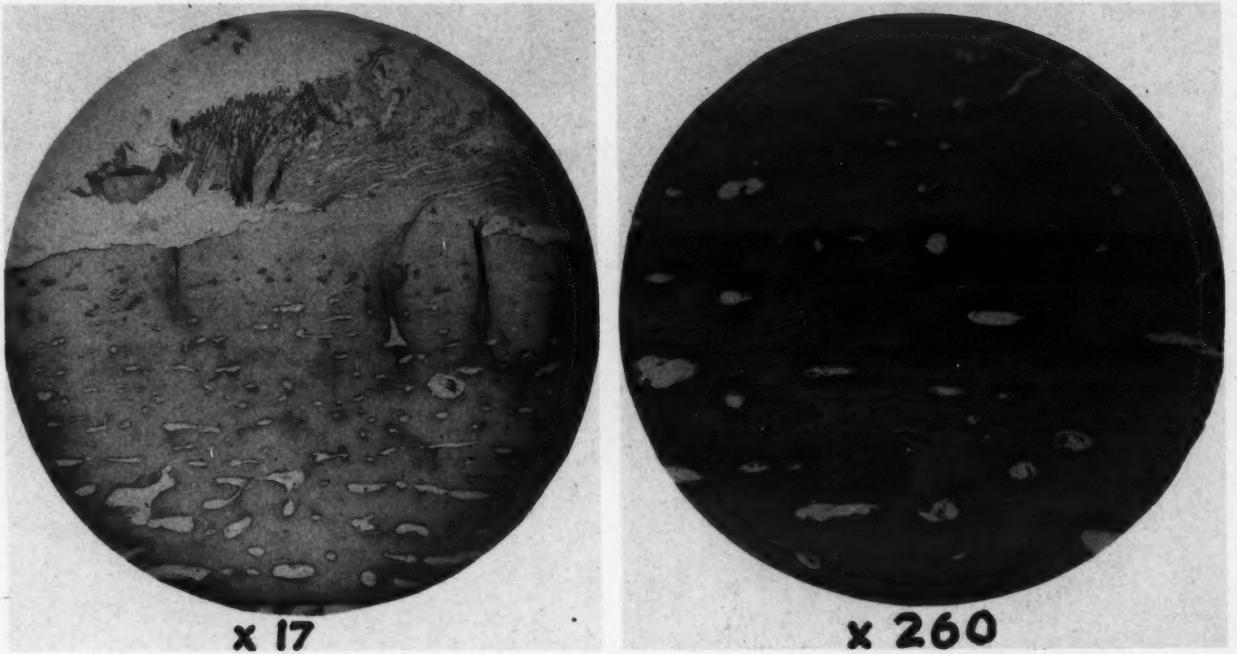

Figure 2. Microscopic sections. Chondrocytes are absent from the lacunas and surface fibrillation is evident.

SYMPTOMATOLOGY AND CLINICAL HISTORY

Most of our patients were admitted to the hospital with a spontaneous onset of pain and swelling in one of the knee joints. A careful history almost always elicited a positive statement as to previous trauma to that knee joint. The symptoms brought about by this condition are suggestive of several other types of mechanical derangement of the joint, and in fact associated lesions are often encountered, particularly those giving rise to instability of the knee joint; for example, relaxed and torn lateral and cruciate ligaments, loose bodies in the joint, and minor nonlocking injuries to one of the menisci. We freely admit that in many of our cases, the diagnosis was made in the operating room where the mechanical derangement expected was not found.

The pain is located at the medial joint line and beneath the patella. Associated with this there is often a sensation of weakness in the joint and instability with pseudolocking which is often difficult to diferentiate from a true locking (such as is found in a joint containing a loose body or a ruptured meniscus). Pseudolocking may also be associated with a chronic sprain of the joint and resulting "weak knee" *(29)*. True locking may occur when loose bodies are broken from the malacic cartilage and have become free within the joint. A feeling of insecurity is often experienced when climbing stairs or vertical ladders, or when ascending or descending a hill or an incline. The patient may call attention to a grating sensation beneath the patella, expecially on forcible flexion or extension of the knee joint or on passive rubbing of the patella over the medial femoral condyle with the leg in full extension. Atrophy of the thigh is almost invariably present. Joint effusion is usually present to a moderate degree and can be increased by exercise. Not infrequently flexion and extension of the joint take place with a "ratchet" type of movement and are accompanied by pain and crepitus beneath the patella at some point in the arc between 90 and 180 degrees. We do not believe that the disability in chondromalacia is caused by loose fragments from the cartilage, causing a chronic synovial irritation, nor that the operation for the relief of this condition is a synovectomy. In most cases loose fragments were not found and there was no evidence on the surface of the cartilage that loose fragments had become dislodged from the patella or that removal of the inflamed synovia would eliminate the primary pathosis which seems to be evident in the patellar cartilage.

The physical signs can usually be correlated with the symptoms. If disruption of the collateral or cruciate ligaments is present anteroposterior or a lateral instability may or may not be demonstrated. "Locking" cannot be produced purposely by the examiner or by the examinee unless a loose body is present in association with malacia.

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(29) Carr, C. R., and Haggart, G. E.: Treatment of acute knee injuries, with special attention to "weak knee" syndrome. U. S. Nav. M. Bull. 42: 787-797, Apr. 1944.

RADIOGRAPHIC APPEARANCE

Although radiographic changes have been reported, in none of our patients has roentgenographic examination been helpful. In chronic cases of long duration, associated with osteophytic production around the margins of the patella and overgrowth on the femoral condyles, some corroborative evidence of derangement within the knee joint may be found on roentgenographic examination. Only 2 of our patients showed any evidence of hypertrophic changes about the edges of

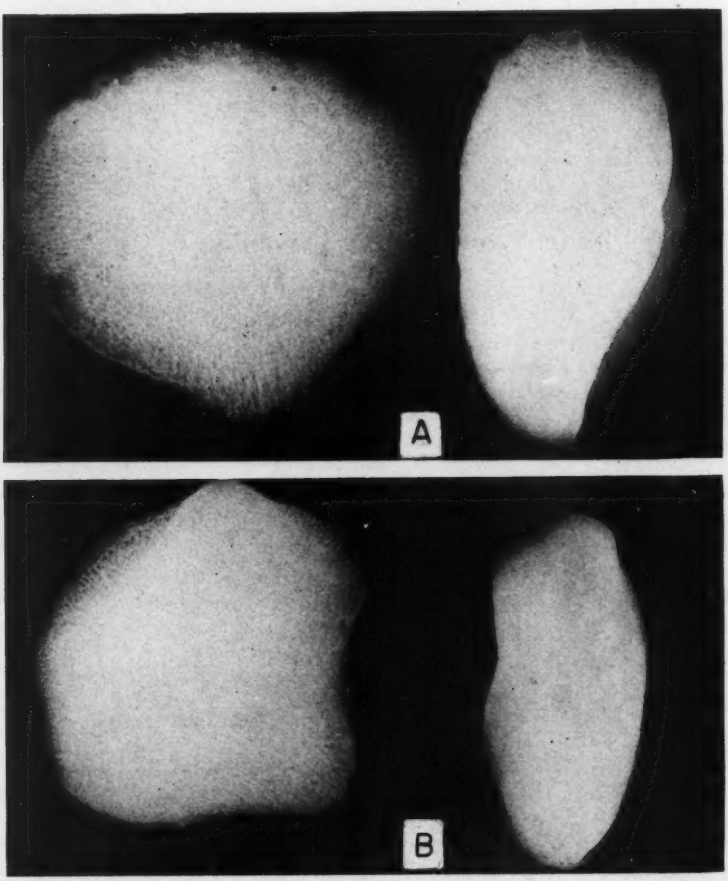

Figure 3. Roentgenographic appearance of excised patellas which at operation showed marked chondromalacia. No evidence of this is shown here. The small defect in the lateral margin of A *was created by a tenaculum at time of operation.*

the patella, and 1 showed some irregularity of the articular surface of the patella. In pre- and post-operative roentgenographic examinations of the patella, no diagnostic criteria could be predicated as characteristic of chondromalacia. Air arthrograms were not made in this study. Two of the excised patellas as shown in figure 3, were subjected to radiographic examination, and in these instances several competent roentgenologists found no definite diagnostic features of chondromalacia. Although roentgenographic examinations of all knees should be performed, the absence of abnormalities should not influence the diagnosis and the subsequent surgical treatment.

SURGICAL TREATMENT

Good surgical management depends on adequate preoperative preparation of the patient. In all operations on the knee joint this includes instruction in the various forms of quadriceps exercises which will be carried out immediately after operation. These exercises are taught and, if the condition of the knee allows, are practiced for several days prior to operation. This establishes the proper pattern of exercise and muscle function in the patient's mind. This is an important factor in operations on the knee joint, particularly for unintelligent and emotional patients, who after operation may fail to use the knee. We have used horseshoe and median parapatellar incisions on these joints. In patients in whom we believe the diagnosis of chondromalacia is presumptive, but in whom other derangements of the joint may be associated, we prefer the median parapatellar incision. The inverted horseshoe incision with reflection of the superior flap has some advantages and has been successfully used. Its use has been reserved for those patients in whom we decided to remove the patella. The median parapatellar incision must extend from the lower border of the vastus medialis to the attachment of the patella tendon on the tibial tubercle. The vastus medialis will usually have to be transected upward from its attachment to the rectus femoris, about 2 inches, to gain sufficient freedom in the quadriceps tendon to evert and inspect the patella. If patellectomy is decided on, the patella is grasped with a double tenaculum forceps and is excised by sharp dissection, leaving the tendon intact. This procedure is tedious as the expansion of the quadriceps tendon over the dorsum of the patella is quite thin and easily buttonholed. By frequent renewal of the knife blades and by working close to the bone, it can be successfully accomplished. When the patella is excised and the knee joint extended, the patellar tendon is much more relaxed than before. It is our custom to plicate the undersurface of the patellar tendon to fill this defect. The scar tissue which forms within this area will eventually produce an external appearance which resembles a normal knee. We use absorbable suture material for the deep repair and cotton or steel wire for the skin. Nonabsorbable material, however, will prove just as effective. With reefing the patellar tendon as described above and with the use of the

maximum amount of soft tissue, a cushion effect is afforded the femoral condyles and a more normal appearance of the knee in extension will result. After closing the wound, we apply a large pressure dressing from toes to groin, with moderate pressure over the patellar space, and maintain elevation of the limb for several days. In our earlier cases we supported what we believed to be the weakened patellar tendon by a posterior molded splint extending the full length of the extremity. We now believe that this is an unnecessary step and that there is little likelihood of a spontaneous or subjective rupture of the reefed quadriceps mechanism. Those procedures which include a transectioned patellar tendon, such as is found in cases associated with comminuted fracture of the patella, or those associated with transverse exposure of the patella, require some support to prevent flexion of the leg for a period of from 14 to 21 days. Straight leg raising and quadriceps exercises are encouraged immediately. When the pressure dressing is removed, a plaster walking cylinder is worn until the twenty-first postoperative day. Albert *(30)* has advised active mobilization in 1 week or less. Dobbie and Ryerson *(31)* state that postoperative splinting is unnecessary.

In reviewing the postoperative course of several patients, we find that 2 of them started active flexion and extension exercises at the end of 11 and 12 days, respectively. The periods of convalescence in these cases were greatly shortened and return of joint function was much more rapid. In retrospect, we believe that we have been far too conservative in the postoperative treatment and might well speed up the patient's return to active duty by decreasing the period of postoperative immobilization.

Since this series was collected we have had the opportunity of performing 6 more patellectomies for this condition. These patients have been immobilized only in a pressure dressing and allowed to begin active knee exercises and weight bearing at will. As yet it is too early for their final evaluation, but we believe this is the better method.

CASE REPORTS

Case 1. A 32-year-old shipfitter was admitted on 9 February 1948 complaining of pain in the left knee of 9 years' duration. He had sustained a twisting injury to the left knee while playing basketball in 1939. Six months following this injury, the medial meniscus was excised. Following operation the patient continued to complain of a rubbing sensation in the knee and a feeling that something was slipping back and forth on the lateral side of the joint. The discomfort grew progressively worse and was aggravated by long standing and exercise.

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(30) Albert, S. M.: Excision of patella; preliminary report. J. Iowa M. Soc. 33: 184-187, Apr. 1943.

(31) Dobbie, R. P., and Ryerson, S.: Treatment of fractured patella by excision. Am. J. Surg. 55: 339-373, Feb. 1942.

Physical examination revealed a three-fourth inch decrease in the circumference of the left thigh and one-half inch decrease in that of the left calf. There was moderate joint effusion, pain along the lateral aspect of the joint and a small tender mass, palpable just beneath the lateral collateral ligament. Roentgenograms of the knee were negative. On 29 March 1948 an arthrotomy was performed on the left knee and the patella excised because of large areas of chondromalacia

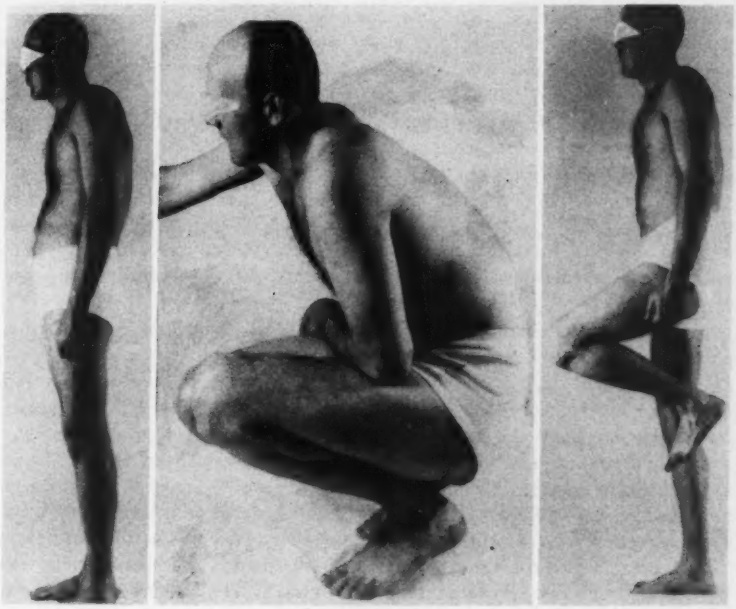

Figure 4 (case 1). Eight months following resection of left patella for chondromalacia.

involving its articular surface. A bucket-handle tear was found in the lateral meniscus and this was also removed. The knee was immobilized in a pressure dressing and the patient started on quadriceps exercises. Function in the knee returned progressively and on 3 May the patient began working 8 hours a day in the hospital brace shop. On 2 April 1949 he was returned to military duty with an asymptomatic knee which exhibited normal function except for a 15-degree limitation of flexion (fig. 4).

Case 2. A 25-year-old retired officer was admitted on 28 February 1949 complaining of pain in the left knee of 1 month's duration. There was no history of recent injury or evidence of inflammation or involvement of other joints. Recalling his past history, he stated that he fell on his left knee in September 1943. In January 1945 he received

a blow to the knee in an airplane crash. The only other symptoms he noted were sharp needlelike pains in the knee joint on forced extension and an occasional buckling of the knee joint while walking, causing him to fall. Physical examination on admission was negative except for some discomfort on sliding the patella over the femoral condyles with the knee flexed. A roentgenographic examination of the knee joint revealed an area of rarefaction in the medial condyle. The patella appeared normal. On 7 March 1949 an arthrotomy was performed and the knee joint was found normal except for a marked chondromalacia of the articular surface of the patella. The patella was excised and the knee immobilized in a padded long-leg plaster cylinder for 3 weeks. In April 1950 the patient had a painless knee which could be extended to 180 degrees and flexed to 45 degrees. There was no quadriceps atrophy and the patient was able to participate in such activities as swimming, running, and dancing. He was seen by a physician postoperatively who did not believe the patella had been removed.

Case 3. A 47-year-old retired warrant officer was admitted complaining of pain and stiffness in his left knee of 1 month's duration. On admission his knee extended to 180 degrees and flexed to 100 degrees, was moderately swollen, and exhibited marked crepitus and pain beneath the patella. At arthrotomy a marked synovitis of fibrinous character and chondromalacia of the patellar cartilage was found. The patella was excised and a moderate amount of synovia removed from the suprapatellar pouch. The postoperative progress was slow and when last seen, 15 months after operation, the patient had relatively little pain in the joint but could only extend to 170 degrees and flex to 115 degrees. He was in great need of vigorous quadriceps drill, which he admittedly had not been doing. He has been at home since the twelfth postoperative day. His result might have been enhanced if he had been under daily supervision. This limitation of motion did not prevent him from doing his regular work as an electrician. It is possible that the partial synovectomy at the time of operation accounts for the major portion of the limitation of flexion.

It has been our good fortune to re-explore the knee of a patient who had a total patellectomy about 19 months earlier. He had been wounded in the knee by shell fragments in 1943. At that time the patella was fractured and subsequently treated in a plaster cast. In January 1947, the patella was excised because it was chronically dislocated. The knee was explored again in September 1948 and a torn medial meniscus removed. At the operation it was noted that the remainder of the joint was entirely normal, with no evidence of erosion or undue wear and tear of the femoral condyles. This finding differs from that of Bruce and Walmsley *(32)* in animals.

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(32) Bruce, J., and Walmsley, R.: Excision of patella; some experimental and anatomical observations. J. Bone & Joint Surg. 24: 311-325, Apr. 1942.

SUMMARY

Of 60 consecutive arthrotomies performed for various internal derangements of the knee joint, 19 were found to have the patellar cartilage involved by chondromalacia. Thirteen of these were associated with other derangements. In 10 of these total patellectomy was performed. It appears that satisfactory function and prevention of further degenerative changes result from the operation. A history of definite trauma was elicited in 89 percent of the cases.

BOOK REVIEW

The Effect of Hormones Upon the Testis and Accessory Sex Organs, by *Norris J. Heckel,* A. B., M. D., Clinical Professor of Urology, Department of Surgery, University of Illinois College of Medicine; Chairman, Department of Urology, Presbyterian Hospital; Attending Urologist, Ravenswood Hospital and Henrotin Hospital; Consulting Urologist, Chicago Intensive Treatment Center, Chicago, Ill. Publication No. 110 American Lecture Series, A Monograph in American Lectures in Endocrinology. 73 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $2.25.

This monograph will have its chief use in bringing the clinician abreast of current knowledge in a field replete with complexities and attended by considerable confusion and difference of opinion. In clear and concise form, the author has developed his subject from the embryology of the male sex organs to the clinical application of the effects of certain hormones on them. Before considering the hormonal groups which influence the male reproductive organs, the anatomy, histology, and physiology of the testes are reviewed briefly. The gametogenic and endocrine functions of the testis are treated separately and a most complete classification of gonadic dysfunction presented. The brevity of the monograph precludes the inclusion of all the syndromes listed but the more common disorders of the male reproductive organs amenable to hormonal therapy are discussed. The history and salient features of fundamental investigations in this significant field are well described before the clinical applications of endocrine therapy are presented. The listing and consideration of the most valuable hormonal therapeutic preparations produced by the various commercial laboratories are of great practical value. The three hormonal groups (gonadotropins, androgens, and estrogens) believed to exert a profound influence on the testis and associated organs are considered, in order, and a careful resume of the proved clinical and experimental effects of their commercially available forms is furnished. The bibliography includes references to key articles relative to the development of this important division of endocrinology and, for such a brief text, the index is unusually complete.—*Capt. S. Johnson, MC, U. S. N.*

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BOOK REVIEW

Diseases of the Ear, Nose, and Throat, A Textbook of Clinical and Laboratory Procedures, by *Georges Portmann,* M. D., Professor of Otorhinolaryngology at the University of Bordeaux; Dean of the School of Medicine and Pharmacy of the University of Bordeaux; Surgeon at the Hospital of Tondu, Bordeaux; Surgeon at the Hospital Leopold Bellan, Paris. Translated by *Fernand Montreuil,* M. D., and *Jules G. Waltner,* M. D., College of Physicians and Surgeons, Columbia University (New York). 728 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., publisher, 1951. Price $20.

Dr. Portmann is well known in this country as a leading French otolaryngologist and has taught here as a visiting lecturer. This book is based on his method of teaching students in this clinical specialty. Each organ is considered, first in its normal condition, then in pathologic conditions. The basic structure and functions are briefly discussed; then methods for diagnosis are presented in great detail. The author lays great stress on history taking. The customary methods of diagnosis and special procedures of functional evaluation are described. Much of the equipment described is French and little used in this country, but the physician may easily read in his own chosen or available instruments. Great stress is laid on refined and elaborate technics of vestibular studies, the one large area that American readers may find hard to accept. It is noted with pleasure that the really fine plates of temporal basic sections the author has exhibited here before are included in the discussion of the ear. This work is only on structure, function, and diagnosis and will be a useful reference for detailed and obscure tests to the specialist, but does not offer the simple and broad picture required by the casual worker in this field.

—*Maj. J. E. Lett, U. S. A. F. (MC)*

The Use of Cortisone and ACTH in Treating Reactions to Penicillin[(1)]

Nestor M. Hensler, *Captain, U. S. A. F. (MC)*
Otto A. Wurl, *Lieutenant Colonel, MC, U. S. A.*
James O. Gillespie, *Brigadier General, MC, U. S. A.*

ALTHOUGH penicillin is considered a relatively innocuous agent, reactions following its administration are not uncommon. The delayed, or serum-sickness, type of sensitivity reaction is particularly distressing. Gilman (2) emphasized the increasing incidence and severity of such reactions and made a plea for more judicious use of penicillin. Although the exact incidence of such reactions is unknown, estimates vary from less than 1 percent (3) to 6 percent (4). One of us (NMH) recently noted an incidence of 4.3 percent delayed reactions in 138 patients receiving single injections of penicillin. When the frequency with which penicillin is used today is considered it is evident that such reactions must be responsible for a great amount of morbidity. Unfortunately, there is no reliable means of predicting who will react unfavorably to the drug (5,6). Treatment with epinephrine and antihistaminic drugs is often only partially successful in alleviating the severe itching, arthritic and myalgic pain, restlessness, and malaise which characterize the disease.

The effectiveness of ACTH and cortisone in relieving the symptoms of rheumatoid arthritis and rheumatic fever suggested the use of these agents in the treatment of a variety of allergic states. Included in the

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(1) Letterman Army Hospital, San Francisco, Calif.

(2) Gilman, R. L.: Penicillin, an allergic hazard. U. S. Armed Forces M. J. 1: 1155-1156, Oct. 1950.

(3) Gordon, E. J.: Delayed serum sickness reaction to penicillin. J. A. M. A. 131: 727-730, June 29, 1946.

(4) Rouse, J. W. H.: Prevention and treatment of severe penicillin therapy and other drug reactions. South. M. J. 43: 195, 1950.

(5) Kolodny, M. H., and Denhoff, E.: Reactions in penicillin therapy. J. A. M. A. 130: 1058-1061, Apr. 20, 1946.

(6) Sherman, W. B.: Drug allergy. Am. J. Med. 3: 586-600, Nov. 1947.

reports on this subject are a small number of severe reactions to penicillin so treated with satisfactory and sometimes dramatic effect (7-10). These encouraging results have prompted the use of ACTH or cortisone in the treatment of 8 patients with severe reactions to penicillin in this hospital. Table 1 summarizes the clinical results in these patients.

CASE REPORTS

Case 1. A 30-year-old man was admitted to this hospital on 21 January 1951 following an accident in which he incurred multiple lacerations and abrasions. Treatment included 200,000 units of aqueous penicillin twice daily beginning on 21 January. On 11 February he developed an urticarial rash with pruritus, and penicillin was discontinued. The urticaria became increasingly severe over a 2-week period in spite of an antihistaminic drug and epinephrine. In addition, severe arthralgia and joint swelling developed. On 28 February, the patient began complaining of difficulty in breathing and swallowing. He was acutely ill, restless, and irritable. There were multiple huge discrete and confluent urticarial lesions over the buttocks and shoulders. His temperature was 98° F.; his pulse was 144; and his blood pressure was 90/65. Symptomatic therapy was discontinued and 25 mg. of ACTH was given every 6 hours. Within 6 hours the patient was subjectively improved and within 12 hours his difficulty in respiration and swallowing was definitely decreased, his pruritus and joint pain were less severe, and his urticaria had decreased by 50 percent. His skin lesions had entirely disappeared within 3 days. His pruritus and joint pain diminished more gradually over a 10-day period. On 9 March ACTH was discontinued after 560 mg. had been given. Within 48 hours the urticarial lesions reappeared and the patient complained of increasing pain in the joints. On 12 March, therefore, treatment with 25 mg. of cortisone intramuscularly every 6 hours was begun. Again, within 3 days the skin lesions disappeared. In 7 days he was asymptomatic except for moderate pruritus and slight back pain. The cortisone was discontinued on 26 March, after 1200 mg. had been given, and an antihistaminic drug was given to control the pruritus. He remained relatively asymptomatic, though he continued to have small areas of transient urticaria every second or third day up to the time of discharge from the hospital on 12 April.

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(7) Carey, R. A.; Harvey, A. M.; Howard, J. E.; and Wagley, P. F.: Effect of adrenocorticotropic hormone (ACTH) and cortisone on drug hypersensitivity reactions. Bull. Johns Hopkins Hosp. 87: 354-386, Nov. 1950.

(8) Howard, J. E.; Harvey, A. M.; Carey, R. A.; and Winkenwerder, W. L.: Effects of pituitary adrenocorticotropic hormone (ACTH) on hypersensitive state. J. A. M. A. 144: 1347-1349, Dec. 16, 1950.

(9) Bordley, J. E.; Harvey, A. M.; Howard, J. E.; and Newman, E. V.: Preliminary report on use of ACTH in hypersensitive state. In Mote, J. R. (editor): Proceedings of the First Clinical ACTH Conference. Blakiston Co., Philadelphia, Pa., 1950. p. 469.

(10) Feinberg, S. M.; Danneberg, T. B.; and Malkiel, S.: ACTH and cortisone in allergic manifestations; therapeutic results and studies on immunological and tissue reactivity. J. Allergy 22: 195-210, May 1951.

Comment. This patient had a severe reaction to penicillin which became worse under symptomatic therapy. The response to ACTH was dramatic, but symptoms recurred within 48 hours after discontinuing this drug. A good symptomatic response was then obtained with cortisone, though this response was less prompt and less complete than that following ACTH. Persistent urticaria indicates that the hypersensitive state still existed at time of discharge from the hospital.

Case 3. A 38-year-old woman was admitted to the hospital on 23 March 1951 for treatment of chronic pelvic inflammatory disease. She was given 300,000 units procaine penicillin daily beginning on the day of admission. On 28 March a laparotomy was performed and penicillin therapy was continued postoperatively until 3 April. On 4 April she developed urticaria on her legs and trunk with severe pruritus. The urticaria spread rapidly in spite of an antihistaminic drug and marked edema of her legs and face developed. On 6 April effusion of her wrist and knee joints was noted and she was extremely uncomfortable because of pruritus. On 7 April treatment with 100 mg. of cortisone every 8 hours was started. After 3 doses it was given in progressively diminishing doses. Within 24 hours the edema and pruritus had almost disappeared and there was marked regression of the urticarial lesions. At the end of 2 days of therapy she was asymptomatic except for mild joint pains. Cortisone was discontinued on 11 April after 600 mg. had been given. Fifteen days later she had a recurrence of urticaria which subsided spontaneously in several days. There were no joint symptoms or other systemic manifestations at this time. Three months later there had been no recurrence.

Case 5. On about 26 April 1951, a 27-year-old man received an injection of aqueous penicillin because of an infection in a tooth. About 6 hours later he noted soreness of his throat and tongue which subsided after a few hours. He was thereafter asymptomatic until 5 May when he noted swelling and itching of the right foot. Within 24 hours marked edema of his hands, feet, and face and a generalized rash developed. His only previous exposure to penicillin was about 2 months previously when he had taken several penicillin troches. Following this his tongue became sensitive and his throat was sore for a short period. About 5 years previously he had had an episode of generalized urticaria following an insect bite. On admission to this hospital on 6 May his temperature was 100° F. and his pulse was 80. There was marked edema of his feet, hands, lips, and periorbital regions. There were numerous urticarial wheals over most portions of his body, especially over his extremities, forehead, and scalp (fig. 1).

In spite of vigorous treatment with an antihistaminic drug, epinephrine, and intravenous procaine, his symptoms increased in severity. His pruritus was intense; his urticaria spread rapidly; and his edema increased. It was necessary to cut a ring to prevent gangrene of one of his fingers. His temperature rose to 103° F. On 7 May, symptomatic therapy

TABLE 1. *Summary of 8 cases of severe reactions*

Case	Age (years)	Sex	Clinical manifestations	Duration of symptoms (days)	Reponse to therapy	
					Clinical improvement (hours)	Complete relief (days)
1	30	Male	Urticaria, arthritis, dysphagia, difficult breathing	18	6	10
				Recurrence	18	7
2	28	Male	Fever, urticaria, arthritis, nausea, severe pruritus	3	24	4
3	38	Female	Urticaria, edema, arthritis with joint effusion	3	24	4
4	36	Male	Persistent urticaria and pruritus after subsidence of arthritis and fever on symptomatic therapy	14	72	6
				Recurrence	Unknown	7
5	27	Male	Fever, lethargy, urticaria, angioneurotic edema, severe pruritus	2	18	8
6	20	Male	Fever, lethargy, nausea, vomiting, urticaria, angioneurotic edema, dysphagia	2	30	5
7	40	Male	Chills, fever, sore throat, arthritis, myalgia, urticaria, bullas, adenopathy	5	5	3
				Recurrence	12	3
				Recurrence	5	1
				Recurrence	5	3
8	21	Male	Chills, fever, sore throat, malaise, urticaria, edema, adenopathy	4	15	2

*All patients were white
IM = intramuscular
IV = intravenous

*to penicillin treated with cortisone or ACTH**

Duration of treatment (days)	Total dosage		Route of administration	Relapse	
	ACTH (mg.)	Cortisone (mg.)		Days after discontinuing treatment	Symptoms
9	560		IM	2	All previous symptoms.
11		1200	IM		Residual urticaria.
8		500	IM		
5		600	IM	15	Transient urticaria. No further treatment needed.
7		650	IM (2 days) Oral (5 days)	9	All previous symptoms.
7		350	Oral		No further recurrence.
10		1050	Oral		
7		800	Oral		
7		775	IM	2	All previous symptoms.
12		1250	IM	2	All previous symptoms
4	100		IV	3	Urticaria. Recurrence of all previous symptoms on sixth day.
3	50		IV	6	Urticaria. Responded dramatically to I. V. ACTH on 3 occasions during next 2 weeks. No response to antihistaminic drugs or I. V. placebo. Asymptomatic 5 days at time of writing
4		450	IM		

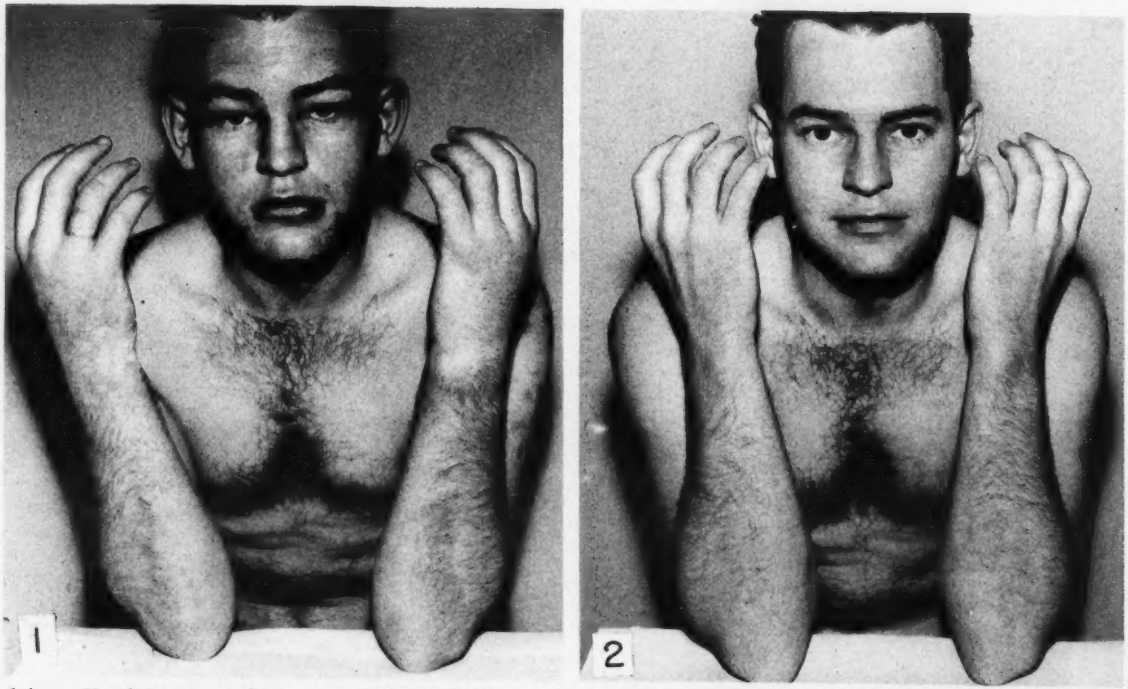

Figure 1 (case 5). Appearance of patient on 7 May 1951. Note marked edema of hands and face, urticaria on arms, forearms, and face. (Cortisone was started 2 hours later.) Figure 2 (case 5). Appearance of patient on 11 May 1951. Edema and urticaria have subsided.

was discontinued and treatment with 50 mg. of cortisone every 6 hours was started. After 2 days the dose was reduced to 25 mg. every 6 hours. His symptoms continued to become more severe for about 10 hours after the institution of cortisone therapy. His lips and eyes became markedly swollen; urticarial lesions covered 70 percent of his body; and he became lethargic. His temperature continued to be between 102° and 103° F. Eight hours later he began to feel better; his edema and urticaria decreased; and his temperature fell to 100° F. By 9 May his edema and urticaria had subsided completely and he was afebrile (fig. 2). His only complaint was mild pruritus. During the next 4 days he had transient localized urticaria. Cortisone was discontinued on 16 May after 1050 mg. had been given. There was no recurrence in the 9 weeks which followed.

Comment. These cases of reaction to penicillin responded promptly to cortisone therapy. In contrast to case 1, there was no recurrence, or minimal recurrence, of symptoms, and no further therapy was required. Cases 2, 6, and 8 responded similarly as shown in table 1.

DISCUSSION

The mechanism whereby cortisone and ACTH modify the allergic process is not known. Sprague *(11)* has summarized the available data on this subject and the various experimental and clinical studies reported will not be recounted here. The evidence indicates that neither circulating antibodies nor skin sensitivity are uniformly altered by these hormones, nor do they seem to act as antihistaminic agents. They apparently act at a tissue level, providing the "susceptible tissues with a shieldlike buffer against the irritant" (12). That they do exert a profound effect on the hypersensitive state is evident from the results noted in these and other cases reported. This effect is illustrated by the 3 patients who responded favorably only to relapse from 2 to 9 days after treatment was discontinued. In all patients resumption of therapy with either ACTH or cortisone resulted in prompt subsidence of symptoms. These cases add further weight to the already overwhelming evidence that ACTH and cortisone merely suppress the manifestations of hypersensitivity without altering the hypersensitive state.

Examination of table 1 might leave the impression that early treatment decreases the chance of recurrence because those patients requiring more than one course of treatment had symptoms for 5 or more days prior to treatment, whereas those without recurrence or with minimal recurrence were treated within 4 days of onset of symptoms. No conclusion can, however, be drawn from such a small series. Although these reactions to penicillin usually run a course of from 7 to 10 days, it is not unusual for symptoms to persist for 30 or more days. It is most

(11) Sprague, R. G.: Cortisone and ACTH; review of certain physiologic effects and their clinical implications. Am. J. Med. 10: 567-594, May 1951.

(12) Hench, P. S.: Introduction: cortisone and ACTH in clinical medicine. Proc. Staff Meet., Mayo Clin. 25: 474-476, Aug. 16, 1950.

likely that the patients who relapsed were destined to chronicity from the onset; therefore, the course of treatment merely failed to encompass the period of hypersensitivity.

All who were concerned with these patients were impressed with the prompt and often dramatic results. Although the routine use of cortisone and ACTH is not recommended for such self-limited and usually benign conditions as reactions to penicillin, these agents may be extremely valuable in patients with (1) severe reactions with high fever, shock, severe arthralgia, or laryngeal or pharyngeal edema; (2) less severe syndromes not responding to symptomatic therapy *(13)*; and (3) reactions which constitute a dangerous complication of an already existing disease *(14)*.

CONCLUSIONS

Treatment with ACTH and cortisone in 8 patients with reactions to penicillin gave favorable results in all instances, although recurrences of symptoms following withdrawal of the drug were not uncommon.

(13) Cases 1 through 7 fall in these two categories.

(14) Case 8 is an example of this. The patient's right foot and ankle were encased in a plaster cast following an arthrodesis a few days previously. In addition to pruritus, urticaria, and fever, edema of the hands and face was evident when cortisone therapy was started. Edema of the feet might have jeopardized the success of his operation. His edema subsided promptly following treatment with cortisone.

Observations on Essentially Normal Young Men Treated With ACTH and Cortisone[1, 2]

I. EFFECTS ON GLUCOSE METABOLISM

Saul B. Appel, *Major, MC, U. S. A.*

Kenneth D. Orr, *Lieutenant Colonel, MC, U. S. A.*

HYPERGLYCEMIA and glycosuria resulting from alterations in carbohydrate metabolism during therapy with ACTH and cortisone have been readily produced in animals (3). Although in the past few years these hormones have been used widely in the treatment of numerous diseases, severe manifestations of glucose intolerance have not been a common or uncontrollable complication.

In 9 of 10 normal human beings treated with 50 to 100 mg. of ACTH daily, hyperglycemia and diabetic glucose tolerance curves began to appear 24 hours after the onset of therapy (3). All patients manifested glycosuria of from 2 to 50 grams daily. The glucose intolerance demonstrated in these normal subjects was attributed to differences in individual end-organ responses (enzymatic effects on insulin production and/or resistance to insulin) (4). The possibility that glucose intolerance during therapy with ACTH and cortisone represents a predisposition to diabetes mellitus or latent diabetes mellitus (5,6) would not explain the frequency with which it was detected in normal persons.

(1) From the Cold Injury Section, Osaka Army Hospital.

(2) The first of three articles on this subject. The statistical analyses were made by H. M. C. Luykx, D. Sc.

(3) Conn, J. W.: Effects of ACTH on carbohydrate metabolism in normal human beings. In Mote, J. R. (editor): Proceedings of the First Clinical ACTH Conference. The Blakiston Co., Philadelphia, Pa., 1950. pp. 86-107.

(4) Conn, J. W.: ACTH diabetes in man; end-organ response versus adrenocortical response. (Abstract) J. Clin. Endocrinol. 10: 825, July 1950.

(5) Sprague, R. G.; Power, M. H.; Mason, H. L.; Albert, A.; Mathieson, D. R.; Hench, P. S.; Kendall, E. C.; Slocumb, C. H.; and Polley, H. F.: Observations on physiologic effects of cortisone and ACTH in man. Arch. Int. Med. 85: 199-258, Feb. 1950.

(6) Thorn, G. W.; Forsham, P. H.; Frawley, T. F.; Hill, S. R., Jr.; Roche, M.; Staehelin, D.; and Wilson, D. L.: Clinical usefulness of ACTH and cortisone. New England J. Med. 242: 783-792, May 18, 1950.

Renal glycosuria has been described after ACTH therapy (7) and this might explain glycosuria to some extent but not a diabetic type of glucose tolerance curve. Some observers have noted an increase in the fasting blood glucose (3,6) and others have found no statistically significant increase (5) even after giving ACTH intravenously (8).

During our study of the effects of ACTH and cortisone on the healing of frostbite lesions, an opportunity was afforded for evaluating the changes in glucose metabolism in a large group of essentially normal young men.

METHODS

The subjects, including the controls, were men with varying degrees of frostbite lesions of either the toes, fingers, or heels. Only one subject (ACTH 56) had severe fourth degree frostbite of both feet necessitating amputation and therapy was discontinued after 12 days because of complicating side effects.

The ACTH group consisted of 14, the cortisone group of 22, and the control group of 23 subjects (9). The mean ages were 22.8, 22.2, and 21.1, respectively. The differences are insignificant. In establishing the glucose tolerance pattern of the control group, 10 additional frostbite patients with comparable lesions were selected at random and tested.

TABLE 1. *Time of admission and treatment as related to onset of frostbite*

Group	Number	Mean number of days between onset of frostbite and	
		Admission	Hormone therapy
ACTH	11	14.5 ± 3.5*	25.1 ± 5.6*
Cortisone	16	14.4 ± 1.5	31.3 ± 3.4
Control	23	25.1 ± 3.7	38.4 ± 3.2

*Standard error

Table 1 shows the time of admission and treatment relative to the onset of frostbite as determined from the clinical history. The critical ratio comparing the differences in the standard error of the means for the control and cortisone group (admission day after frostbite) is 2.7 ($P = 0.007$). The glucose tolerance tests were not done until well after hormone therapy was started and there was no significant difference between the groups at this time. The subjects had been exposed for

(7) Bunim, J. J.: Clinical effects of cortisone and ACTH on rheumatic diseases. Bull. New York Acad. Med. 27: 75-100, Feb. 1951.

(8) Sayers, G.; Burns, T. W.; Tyler, F. H.; Jager, B. V.; Schwartz, T. B.; Smith, E. L.; Samuels, L. T.; and Davenport, H. W.: Metabolic actions and fate of intravenously administered adrenocorticotropic hormone in man. J. Clin. Endocrinol. 9: 593-614, July 1949.

(9) A few of these who developed toxic symptoms did not receive the full course of hormonal treatment and were not included in the final tabulation.

varying periods of time to combat, fatigue, and lack of various edible delicacies. Their appetites for soft drinks and candy were often ravenous and persisted throughout the period of observation; cortisone 30 prided himself on consuming 24 chocolate bars daily. All subjects were on an unlimited dietary intake except for 2 in the cortisone group (59,60) and 2 in the ACTH group (57,58) whose fluid intake was reduced; they were allowed only 2 bottles of soft drink and 1 candy bar daily. Only 1 subject (cortisone 59) presented a familial history of diabetes mellitus, and his glucose tolerance tests on the fifteenth and twenty-fourth days of therapy were normal. Three control subjects had similar familial histories, 2 demonstrating normal tolerance and 1 a 2-hour level greater than his fasting level.

Twenty mg. of ACTH was administered intravenously in 1 liter of 5 percent dextrose in water or saline solution except when the infusion was coupled with a glucose tolerance test, at which time the infusion was normal saline solution without dextrose. The infusion lasted about 6 hours and was maintained for 31 consecutive days. Therapy had been established for 9 days prior to the beginning of this study. Cortisone was given orally as follows: 400 mg. (100 mg. every 6 hours) for 1 day; 300 mg. (75 mg. every 6 hours) on the second day, 200 mg. daily (50 mg. every 6 hours) until the twelfth day at which time 200 mg. (100 mg. at 0800 and at 2000) was given daily through the thirty-first day.

When glucose tolerance tests were performed 100 gm. of dextrose were dissolved in about 240 ml. of chilled lemonade, to which was added 30 ml. of medicinal whisky to increase palatability and cooperation of the subjects. About 4 ml. of blood was drawn and mixed with a dehydrated preparation of sodium fluoride and potassium oxalate, prepared routinely in the laboratory in special screw-topped vials. Specimens were drawn at 0 (fasting), ½, 1, 2, and 3 hours. With the cooperation of the nursing staff it was possible to perform from 10 to 13 tests simultaneously with negligible errors in timing. The subjects voided prior to the ingestion of the mixture. Subsequent urine was collected until the last venipuncture. This urine was tested by the Benedict qualitative test for glucose. The blood sugar concentration was determined by the Folin and Wu method.

A modified Thorn eosinophil test *(10)* was made on all subjects. These tests were performed by the same technician throughout this study. The stock staining and diluting solution consisted of 2 grams of eosin in 100 ml. of 95 percent alcohol which was refrigerated. The test solution consisted of 5 ml. of stock solution, 5 ml. of acetone and 90 ml. of distilled water. It was refrigerated and renewed every 7 days. Prior to the intravenous administration of ACTH (20 mg. in 1 liter of normal saline solution) venous blood was drawn and mixed for 30

(10) Thorn, G. W.; Forsham, P. H.; Prunty, F. T. G.; and Hills, A. G.: Test for adrenal cortical insufficiency: response to pituitary adrenocorticotropic hormone. J. A. M. A. 137: 1005-1009, July 17, 1948.

TABLE 2. *Glucose tolerance tests: ACTH subjects*

Day of therapy	Procedure	Mean mg. per 100 ml. at:				
		Fasting	1/2 hr.	1 hr.	2 hr.	3 hr.
18-19	Routine test with dextrose orally	69.5 ± 2.00*	104.0 ± 3.67*	96.2 ± 8.32*	80.1 ± 5.73*	70.0 ± 2.75*
20	Intravenous infusion of ACTH for 2 hours with dextrose orally	88.4 ± 2.18	111.6 ± 4.30	117.4 ± 6.36	103.2 ± 4.28	101.5 ± 4.40
27	Intravenous infusion of ACTH for 2 hours with no dextrose	77.2 ± 3.38	78.6 ± 3.99	82.8 ± 3.37	84.4 ± 3.67	83.6 ± 4.04
Days after therapy						
17	Routine test with dextrose orally	79.4 ± 4.09	92.6 ± 7.99	92.9 ± 7.74	77.5 ± 6.59	72.3 ± 3.64
24	Routine test with dextrose orally	77.0 ± 2.45	105.0 ± 7.16	101.0 ± 17.92	74.5 ± 4.59	71.0 ± 1.16

*Standard error

seconds in tubes containing desiccated ammonium potassium oxalate. Blood was drawn up to the 1.0 mark, the pipette was filled with test solution and shaken by hand for about 3 minutes. Both chambers of a standard Nebauer ruled hemocytometer were charged. The sum of the eosinophils of the entire ruled area in both chambers was obtained and multiplied by 11.1 to give the number of eosinophils per cu. mm. Eosinophil counts were made at 0 and 5 hours after starting the ACTH infusion which ran rapidly and was completed in from 1 to 2 hours.

RESULTS: ACTH GROUP

Table 2 shows the mean values with their standard error of the serial glucose tolerance tests. In figure 1 curves 6, 7, 8, 9 represent the means. The number of observations ranged from 11 to 13 except on the twenty-fourth day after treatment when 4 subjects who had previously demonstrated abnormal results were studied. Comparing these results with the control group means $\pm$ 2 S. E. (table 3) the following conclusions may be drawn:

1. On the eighteenth day of therapy only the fasting specimen is significantly lower in the treated group.

2. On the twentieth day of therapy the fasting specimen is significantly elevated. We cannot account for this rise as compared to results on the 2 previous days in the same group of subjects.

3. The results at 1, 2, and 3 hours on the twentieth day indicate that the ACTH infusion prevented the blood glucose from falling to the fasting levels.

TABLE 3. *Glucose tolerance tests: Control subjects*

Mean mg. per 100 ml. at:				
Fasting	1/2 hr.	1 hr.	2 hr.	3 hr.
80.7 ± 1.47*	105.5 ± 3.03*	95.9 ± 3.63*	80.9 ± 2.41*	71.0 ± 1.81*

*Standard error.

No subject had glycosuria during this procedure. On the twenty-seventh day of therapy the ACTH infusion was administered without giving glucose to evaluate the effect on the fasting blood glucose. When the standard errors of the means of the 1, 2, and 3 hour specimens are compared with that of the fasting specimen there appears to be no significant difference, but if the individual increments during the procedure are analyzed (table 4) 8 of 13 subjects (except 4, 8, 9, 57, and 58) showed a definite gradual rise. Unfortunately, these subjects were not tested in the fasting state without an infusion of ACTH, but if we compare the mean of the increment for each time interval with its standard error (assuming that there would be negligible changes in the fasting blood glucose level without the ACTH infusion over a 3-hour period) we

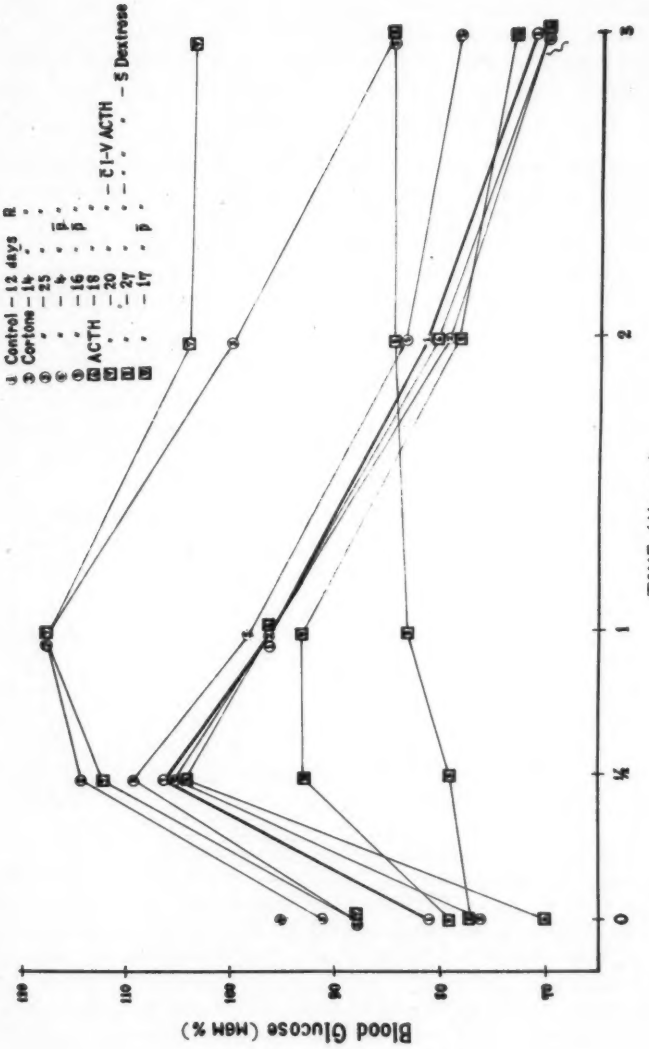

Figure 1. Glucose tolerance tests.

find the following critical ratios: (1) at ½ hour, 0.52 (P = 0.38) which is not significant; (2) at 1 hour, 2.12 (P = 0.036) which is probably significant; (3) at 2 hours, 3.43 (P = 0.0007) which is highly significant; and (4) at 3 hours, 2.67 (P = 0.008) which is highly significant. Thus, intravenous infusion of ACTH in fasting subjects produced a rise in 8 of 13, or a general significant rise 1, 2, and 3 hours after starting the infusion. Some previous observers (5, 8) noted no significant change while others (3, 6) have described an increase in fasting blood sugar during therapy. Seventeen days after therapy the glucose tolerance curves were within normal limits. The curves of 4 subjects were abnormal; 2 were flat and 2 were elevated at 2 hours. These were all normal 1 week later. Simultaneous administration of ACTH intravenously and glucose orally elevated the 1-hour level and obliterated the 2- and 3-hour fall.

TABLE 4. *Change in fasting blood glucose (in mg. per 100 ml.) during intravenous infusion of ACTH*

Subject	Time (hours)								
	0	1/2		1		2		3	
	Absolute	Absolute	Net	Absolute	Net	Absolute	Net	Absolute	Net
1	98	104	+ 6	92	−6	102	+ 4	110	+ 12
2	87	107	+ 20	106	+ 19	112	+ 25	106	+ 19
3	70	87	+ 17	85	+ 15	82	+ 12	83	+ 13
4	76	73	− 3	75	− 1	77	+ 1	79	+ 3
5	72	72	—	85	+ 13	82	+ 10	71	− 1
6	61	70	+ 9	71	+ 10	78	+ 17	65	+ 4
7	77	77	—	93	+ 16	93	+ 16	89	+ 12
8	96	87	−9	96	—	101	+ 5	104	+ 8
9	83	71	− 12	73	−10	73	−10	73	−10
10	61	61	—	73	+ 12	73	+ 12	75	+ 14
11	68	70	+ 2	73	+ 5	78	+ 10	80	+ 12
57	68	62	−6	65	−3	73	+ 5	71	+ 3
58	87	81	−6	89	+ 2	73	−14	81	− 6
Mean net change		+ 1.38		+ 5.54		+ 7.15		+ 6.38	
Standard error		2.64		2.61		2.09		2.39	

RESULTS: CORTISONE GROUP

Table 5 shows the means and standard errors for the cortisone group. In figure 1 curves 2, 3, 5 and point 4 represent the means. On the ninth through twelfth days of therapy there was no significant difference as compared with the control group. On the twenty-fifth and twenty-sixth days of therapy there was a significant elevation of the fasting blood glucose level and the tolerance test was significantly elevated at 1, 2,

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TABLE 5. *Glucose tolerance tests: cortisone subjects*

Day of therapy	Mean mg. per 100 ml. at:				
	Fasting	1/2 hr.	1 hr.	2 hr.	3 hr.
9-12	75.5 ± 2.03*	104.7 ± 3.41*	96.2 ± 4.67*	79.2 ± 3.93*	70.3 ± 2.42*
25-26	90.5 ± 1.81	113.5 ± 4.34	116.8 ± 3.91	98.5 ± 6.57	83.5 ± 2.50
Days after therapy					
4	94.6 ± 2.09	–	–	–	–
15-16	87.9 ± 11.12	109.1 ± 8.04	98.4 ± 17.45	83.2 ± 16.37	77.6 ± 11.27
24	82.7 ± 1.69	111.3 ± 3.79	112.4 ± 10.42	88.6 ± 11.37	76.4 ± 4.95

*Standard error

and 3 hours. Point 4 in figure 1 represents the fasting blood glucose 4 days after therapy, 94.6 ± 2.09. Comparing the difference in the standard error of the mean with that of the control group, 80.7 ± 1.47, the critical ratio is 5.5, and P is less than 0.0000006 or highly significant.

ABNORMAL GLUCOSE TOLERANCE TESTS

Glucose intolerance was interpreted as either any blood glucose value during a tolerance test outside the range of 2 standard deviations of the control group or a higher blood glucose value at 2 hours than at

TABLE 6. *Abnormal glucose tolerance tests: ACTH group*

Subject	Day of therapy	Mg. of glucose per 100 ml. at:				
		Fasting	1/2 hr.	1 hr.	2 hr.	3 hr.
57	2	71	85	105	110	62
2	18	69	141	150	102	76
8	18	78	96	152	127	95
9	18	70	101	96	78	62
	Days after therapy					
2	17	86	107	111	118	68
9	17	111	120	125	111	97

TABLE 7. *Abnormal glucose tolerance tests: cortisone group*

Subject	Day of therapy	Mg. of glucose per 100 ml. at:				
		Fasting	1/2 hr.	1 hr.	2 hr.	3 hr.
15	14	79	123	136	133	78
18	14	74	87	149	70	84
20	14	72	98	68	83	83
25	14	79	115	87	94	78
31	14	67	126	124	94	54
12	25	71	92	89	78	78
14	25	104	117	121	95	93
15	25	97	122	158	175	97
17	25	94	113	121	111	91
18	25	79	140	132	128	61
19	25	90	117	107	104	82
20	25	100	104	107	100	93
24	25	82	86	96	91	80
25	25	85	104	202	83	70
30	25	96	104	132	128	84
31	25	102	154	200	159	104
	Days after therapy					
15	4	125	–	–	–	–
20	4	102	–	–	–	–
22	4	100	–	–	–	–
30	4	100	–	–	–	–
31	4	108	–	–	–	–
12	16	74	108	87	86	74
15	16	92	133	158	150	107
16	16	115	108	105	100	104
17	16	78	114	90	82	85
18	16	137	148	126	85	73
20	16	83	124	84	93	66
21	16	104	134	104	72	94
22	16	100	120	115	80	78
31	16	75	104	127	104	108
14	24	85	123	96	93	77
15	24	85	100	158	139	102
31	24	83	119	133	119	65

the time of starting the test. In the ACTH group, 2 subjects were tested on the second and fourth day of therapy, the former (57) exhibiting glucose intolerance. On the eighteenth day of therapy, 3 of 13 and on the seventeenth day *after* therapy 2 of 11 subjects showed glucose intolerance (table 6). In the cortisone group on the fourteenth day of therapy, 5 of 20 and on the twenty-fifth day of therapy 11 of 20 subjects showed glucose intolerance. On the fourth day *after* therapy, 5 of 20 subjects demonstrated an elevated fasting blood glucose; and on the sixteenth day *after* therapy 9 of 20 subjects showed glucose intolerance. On the twenty-fourth day *after* therapy 7 of the subjects (14, 15, 16, 18, 21, 22, and 31) who had abnormal tests 8 days previously were tested; 3 of them still showed glucose intolerance (table 7). Two subjects (cortisone 25, 31) had a blood glucose level of 202 and 200 mg. per 100 ml. respectively, at 1 hour. The former may have been an error because of the otherwise relatively normal values recorded. Glycosuria was not observed in any of the subjects during the glucose tolerance tests.

TABLE 8. *Eosinophil test: ACTH subject**

Day		Number	Eosinopenia over 50 percent		Mean change (percent)
of therapy	after therapy		Number	(percent)	
27		13	12	92**	-87 ± 4.9***
	10	11	8	73	-63 ± 6.9
	12	4	3	75	-66 ± 15.6

*20 mg. of ACTH in 1,000 ml. of normal saline solution was given intravenously as rapidly as possible (in from 1 to 2 hr.).

**The cumulative eosinopenia indicates the total number of subjects in a group tested serially who showed a significant response to the eosinophil test, i. e., a fall in circulating eosinophils of 50 percent or more 5 hours after the onset of an intravenous infusion of 20 mg. of ACTH in 1 liter of normal saline solution.

***Standard error.

RELATIONSHIP OF GLUCOSE INTOLERANCE TO EOSINOPHIL RESPONSE

The ACTH group showed normal eosinophil responses with a few exceptions on the twenty-seventh day of therapy and on the tenth day *after* therapy (table 8). Subject 57 showed an elevated 2-hour blood glucose level on the second day of therapy, a drop of 41 percent in eosinophils on the tenth day of therapy, a normal glucose tolerance test on the eighteenth day of therapy, and a drop of 100 percent in eosinophils on the twenty-fourth day of therapy. The 3 subjects with drops less than 50 percent (41 percent in subject 1, 30 percent in subject 7, and 46 percent in subject 11) on the twelfth day *after* therapy showed normal glucose tolerance throughout.

TABLE 9. *Eosinophil tests: cortisone subjects (1)*

Day after therapy	Number tested	Eosinopenia over 50 percent		Mean change (percent)
		Number	Percent	
3	20	4	20	− 5 ± 15.6[2]
10	19	7	37	+15 ± 20.9
12	15	7	47[3]	−23 ± 19.2
17	9	4	44	−36 ± 12.5
17	11[4]	1	9	+ 9 ± 12.5
19	20[5]	9	45	−41 ± 6.3
19[7]	10	7	70	−50 ± 13.7
23	7	3	43[6]	−51 ± 12.8

(1) 20 mg. of ACTH in 1,000 ml. of normal saline solution was given intravenously as rapidly as possible (in from 1 to 2 hr.).

(2) Standard error.

(3) The cumulative eosinopenia was $\frac{12}{20}$ or 60 percent.

(4) Control subjects into whom an infusion of saline solution without ACTH was injected.

(5) 100 mg. of cortisone was given by mouth instead of the ACTH.

(6) The cumulative eosinopenia was $\frac{15}{19}$ or 79 percent.

(7) Control subjects tested with 100 mg. of cortisone by mouth 4 hours before test and no infusion.

Table 9 shows the results of the eosinophil tests in the cortisone group. The refractoriness of the adrenal cortex after cessation of therapy is evident as long as 17 and 23 days after therapy. It appears that disturbances in carbohydrate metabolism may persist even though the eosinophil response to ACTH returns to normal after cortisone therapy. In this group on the fourth day *after* therapy there were 5 abnormal fasting glucose levels (subjects 15, 20, 22, 30, and 31). Their eosinophil responses on the previous day were -34, -20, -64, -86, and -14 percent respectively. On the sixteenth day *after* therapy 9 subjects had abnormal glucose tolerance tests and their eosinophil responses are shown in table 10. Five of these subjects (15, 16, 18, 20, and 22) had normal responses. Thus, in 14 subjects with persisting glucose intolerance after therapy a normal eosinophil response was present in 7.

DISCUSSION

The subjects studied demonstrated other side effects in addition to alterations in glucose tolerance. Hypertension and the development of a "moon face" appeared more frequently in the cortisone than in the ACTH group *(11)*. This discrepancy may be related to the difference in method of administration of the drugs. Theoretically ACTH should

(11) Appel, S. B.; Fulton, L. A.; and Orr, K. D.: Observations on essentially normal young men treated with ACTH and cortisone. III. Side effects. To be published.

TABLE 10. *Eosinophil tests of subjects in cortisone group with abnormal glucose tolerance tests on sixteenth day after therapy*

Subject	Eosinophil response (percent change)		
	Day after therapy		
	10	12	17
12	+ 25	—	—
15	+ 20	−84	−61
16	− 50	−34	−69
17	+ 25	0	−14
18	− 50	−87	—
20	− 72	—	—
21	+114	−41	+ 8
22	− 59	—	—
31	—	+33	−37

be administered at a constant rate. In previous investigations (3, 5, 6) the drug was given in divided doses intramuscularly every 6 hours. The intravenous route potentiates the clinical effects approximately tenfold (12). In rats the ACTH level falls logarithmically, and the half time of disappearance is about 5.5 minutes (13). After intracardiac injection of iodinated (I^{131}) ACTH in rats, Sonenberg et al. (14) demonstrated maximum concentration of radioactivity in the adrenal cortex immediately after administration. After 2 hours practically no radioactivity was detected (14, 15). Thus, we may assume that the subjects treated with a daily 6-hour intravenous infusion of ACTH experienced adrenal cortical stimulation for at least 8 hours but probably not much longer.

No instance of foreign protein reaction was observed during or following either the 6-hour or rapid (1- to 2-hour) ACTH infusion. There was no significant alteration in arterial blood pressure during the infusion (11). The fasting blood glucose rose during a 3-hour infusion.

No instance of clinical hypoglycemia (6) or other untoward effects were noted after the abrupt cessation of hormone therapy. Seventeen days after therapy 5 of 11 subjects in the ACTH group had flat glucose

(12) Talbott, J. H.: Personal communication.

(13) Greenspan, F. S.; Li, C. H.; and Evans, H. M.: Disappearance rate of adrenocorticotropic hormone from rat's plasma after intravenous injection. Endocrinology 46: 261-264, Mar. 1950.

(14) Sonenberg, M.; Keston, A. S.; and Money, W. L.: Studies with labelled anterior pituitary preparations; adrenocorticotropin. Endocrinology 48: 148-161, Feb. 1951.

(15) Keston, A. S.: Personal communication.

tolerance curves, but the results for the entire group were not significantly altered. Two of these subjects were retested a week later and showed physiologic curves. Three of 20 subjects in the cortisone group showed slight flattening of the tolerance test on the sixteenth day *after* therapy.

The results indicate that mild glucose intolerance is common during therapy with ACTH and cortisone in essentially normal young men. Because of the limited data the earliest appearance of alterations in glucose metabolism was not determined. For the cortisone group as a whole, however, significant disparity from the control group was not observed on the fourteenth to seventeenth days of therapy but was noted on the twenty-fifth and twenty-sixth days. These alterations persisted in some subjects to the seventeenth and twenty-fourth days *after* therapy (cortisone 15 and 31).

The glucose tolerance test demonstrated abnormalities after the fasting blood glucose determinations, eosinophil tests and blood pressure records *(11)* returned to normal. A "diabetogenic response" to ACTH or cortisone therapy was elicited in most normal subjects in whom repeated glucose tolerance tests were performed. The frequency of a mild diabetogenic response suggests that it is related to dosage and duration of therapy rather than to a major difference in end-organ susceptibility *(4)*. ACTH intravenously coupled with an oral glucose load demonstrated a significant alteration in glucose tolerance as suggested previously *(8)*. A direct pharmacologic action is likely, and individual variability rather than susceptibility probably determines the magnitude of the alteration in glucose metabolism.

The absence of glycosuria during the glucose tolerance tests suggests that renal tubular reabsorption of glucose was not grossly diminished.

CONCLUSIONS

Mild alterations in glucose metabolism were commonly observed during ACTH and cortisone therapy in essentially normal young men. The fasting blood glucose was significantly elevated during cortisone therapy and during an intravenous infusion of ACTH. ACTH given intravenously with an oral dose of glucose produced significant hyperglycemia. No instances suggesting clinical diabetes mellitus were observed.

BOOK REVIEW

The Kidney, Structure and Function in Health and Disease, by *Homer W. Smith,* A. B., Sc. D., M. S., Professor of Physiology, New York University College of Medicine. 1049 pages; illustrated. Oxford University Press, New York 11, N. Y., publishers, 1951. Price $12.50.

The author, a noted physiologist and outstanding authority on the function of the kidney in vertebrates, has scanned the experiments in renal physiology during the past quarter century and compiled a comprehensive volume relating to present concepts of this organ's regulatory and excretory operations. The scope of his research is reflected in the 2,300 bibliographic entries referred to and quoted liberally. His concepts embrace the recent anatomic studies of circulation by Trueta et al. and the physiologic effects of the steroid compounds of the adrenal cortex.

The text, after a short introduction discussing theories of renal function, is for some obscure reason presented in four sections. Part 1 covers basic anatomy, and renal clearances, experimental and determinative, in great detail. Part 2 covers the antidiuretic hormone and excretion of water; excretion of sodium and other electrolytes; the adrenal cortex and Addison's disease; and acid-base equilibrium in plasma and urine. Part 3 outlines the control of renal circulation and the action of drugs; trophic and other factors (including hormones and vitamins) related to function; renal function in infant and child; comparative physiology; and renal hemodynamics. Part 4 contains chapters on the disturbances of renal function during disease, including salt and water balance; disequilibrium in nonrenal diseases; chronic congestive heart failures; essential hypertension; the effects of traumatic and toxic injuries; "primary" diseases of the kidney and urinary tract; the anatomy, physiology, and significance of the juxtamedullary circulation; and a discussion of diuretics.

Illustrations are sparse, and consist mostly of graphs or charts. The print is large and clear. The bibliography is alphabetically arranged by author and includes the page number of the reference. Unfortunately for the medical profession this monumental work is essentially a reference volume, in which the author writes above the knowledge or the interest of the average student or physician. The reading is dry, the figures and arithmetic symbols necessary to the infinite experimental data are disconcerting, and the author makes no effort to emphasize conclusions to be drawn from the elaborate dissertations. In addition, the paucity of discussion of renal pathology and the presence of only one microphotograph will grieve the urologist and the internist, both eager to apply the products of such vast experimental research to their vexing clinical problems.—*Lt. Col. C. W. Hoffman, MC, U. S. A.*

Chronic Granuloma Following Wound Contamination by Beryllium Silicate

Orland G. Davies, Jr., *Captain, U. S. A. F. (MC)* (1)

THE public health hazards of beryllium compounds have been emphasized by numerous authors in the past decade. Most of these reports are concerned with the inhalation of beryllium dust and the chemical pneumonitis which results (2-6), but in the past 5 years granulomatous lesions in the skin following lacerations produced by broken fluorescent bulbs have been reported (7-13). This lesion is being recognized with increasing frequency.

(1) U. S. Air Force Hospital, Hamilton Air Force Base, Hamilton, Calif.

(2) Van Ordstrand, H. S.; Hughes, R.; De Nardi, J. M.; and Carmody, M. G.: Beryllium poisoning. J. A. M. A. 129: 1084-1090, Dec. 15, 1945.

(3) Hardy, H. L., and Tabershaw, I. R.: Delayed chemical pneumonitis occurring in workers exposed to beryllium compounds. J. Indust. Hyg. & Toxicol. 28: 197-211, Sept. 1946.

(4) Martland, H. S.; Brodkin, H. A.; and Martland, H. S., Jr.: Occupational beryllium poisoning in New Jersey (with special reference to its incidence, diagnosis and compensation). J. M. Soc. New Jersey 45: 5-14, Jan. 1948.

(5) Titus, A. C.: Air contamination during machining of beryllium stainless steel. J. Indust. Hyg. & Toxicol. 30: 29-31, Jan. 1948.

(6) Gilman, I.: Beryllium (Glucinium). Occupation and Health Supplement. International Labor Office, Geneva, 1938.

(7) Nichol, A. D., and Dominguez, R.: Cutaneous granuloma from accidental contamination with beryllium phosphors. J. A. M. A. 140: 855-860, July 9, 1949.

(8) Forsythe, W. E., and Adams, E. Q.: Fluorescent and Other Gaseous Discharge Lamps, New York and Toronto, Murray Hill Books, New York, N. Y., 1948.

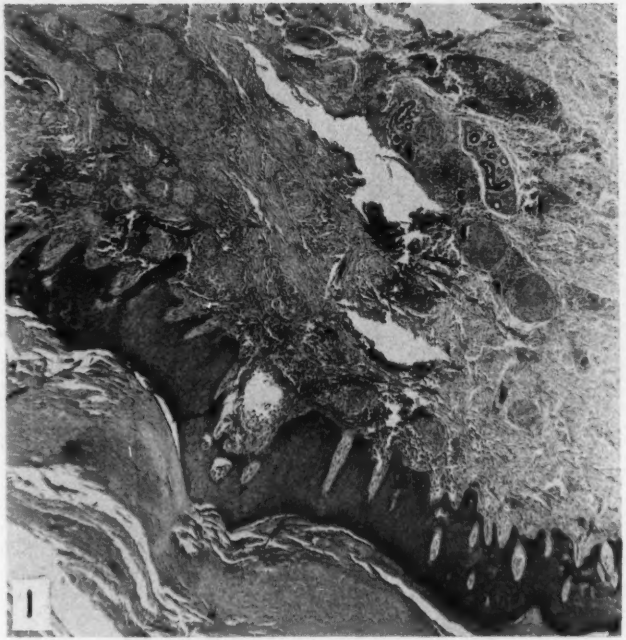
(9) Grier, R. S.; Nash, P.; and Freiman, D. G.: Skin lesions in persons exposed to beryllium compounds. J. Indust. Hyg. & Toxicol. 30: 228-237, July 1948.

(10) Shook, C. F., and Powell, J. P.: Beryllium case. Indust. Med. 17: 403-404, Oct. 1948.

(11) Wounds contaminated by beryllium phosphors. (Queries and Minor Notes section) J. A. M. A. 139: 1047, Apr. 9, 1949.

(12) Coakley, W. A.; Shapiro, R. N.; and Robertson, G. W.: Granuloma of skin at site of injury by fluorescent bulb. J. A. M. A. 139: 1147-1148, Apr. 23, 1949.

(13) Davis, C., and Grimes, O. F.: Skin granuloma following laceration by fluorescent lamp. California Med. 74: 203-205, Mar. 1951.



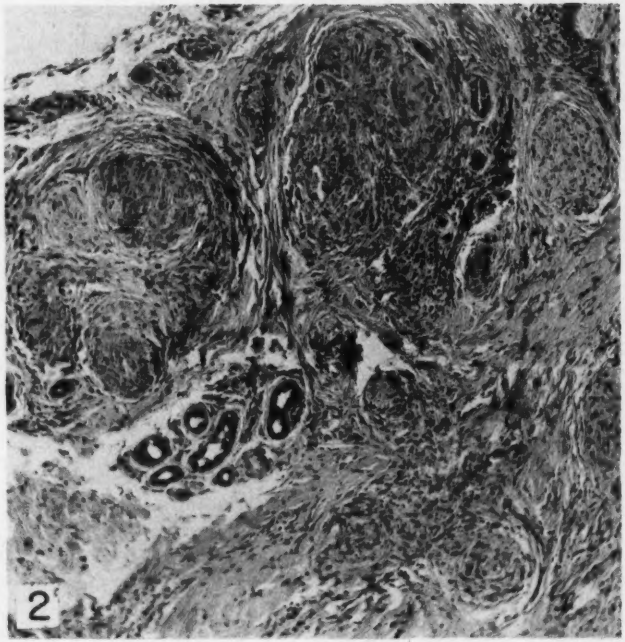


Figure 1. Low-power microscopic appearance of the lesion excised from the sole of the foot. Figure 2. High-power view of the same lesion showing the tubercle consisting of the epithelioid cells diffusely infiltrated with lymphocytes.

CASE REPORT

In November 1950 a 20-year-old airman was first seen in the outpatient department of this hospital because of a tender, inflamed scar on the medial aspect of the right foot. Eleven years prior to consultation he had cut his foot on a broken fluorescent lamp. This wound healed without delay and remained asymptomatic for the ensuing 8 years, then he noticed progressive redness, thickening, and tenderness of the scar. This lesion was excised under local anesthesia in November 1950 but the specimen was not examined microscopically. The postoperative scar remained tender, red, and indurated and ulceration and crusting persisted in its center.

In February 1951 the patient was again seen in the outpatient department at which time the scar was raised, tender, and inflamed and had a small central area of necrosis and crusting. Roentgenograms of the chest and foot, taken at this time, were normal. A presumptive diagnosis of "beryllium granuloma" was made despite the long latent period following the original injury. The area was again excised and microscopic examination of the tissue removed revealed an increased amount of deeply staining, collagenous material which was diffusely infiltrated by many epithelioid cells and lymphocytes. There were numerous noncaseating tubercles surrounding these hyalinized areas with occasional giant cells of the foreign-body type (figs. 1 and 2). A diagnosis of chronic granuloma of the skin consistent with beryllium granuloma was made. Special spectrographic studies of the urine and tissue removed as described by Fairhall *(14)* were not made.

In March 1951 the patient was seen in the outpatient department and the scar again showed the chronic inflammatory changes that were present before treatment. The area was again excised, this time giving a full 1 cm.-margin on all sides and extending to and including the deep fascia of the foot. Following this operation, the area healed and the resulting scar was normal in appearance.

(14) Fairhall, L. T., et al.: The toxicology of Beryllium. National Institute of Health Bulletin No. 181. Federal Security Agency, United States Public Health Service, Division of Industrial Hygiene, National Institute of Health, Washington, D. C., 1943.

EDITOR'S NOTE: This case is described briefly (case 9) in a paper by Helwig, E. B.: Chemical (beryllium) granulomas of skin. Mil. Surgeon 109: 540-558, Oct. 1951.

Scientific Award

On 27 November 1951 at the meeting of the American Pharmaceutical Manufacturers' Association in New York City, the Association presented a plaque to Dr. W. Randolph Lovelace, II, Chairman of the Armed Forces Medical Policy Council and a similar plaque to the Surgeons General of each of the Armed Forces. In accepting this award Dr. Lovelace said:

> "On behalf of the Armed Forces Medical Policy Council, I wish to express sincere appreciation of this honor which the American Pharmaceutical Manufacturers' Association has bestowed on the medical services of the Armed Forces. It is with a feeling of deep gratification that I see the efforts of the individuals in these services so recognized, and I am confident that they will continue to make significant contributions to the advancement of medicine."

The inscription on the plaque read as follows:

1951 Scientific Award

presented to the

Medical Services of the Armed Forces

(name of recipient)

In recognition of the numerous scientific contributions in medical research, prophylactic and therapeutic practices and other life-saving measures which have vastly strengthened the defensive and combat forces of our nation

by

American Pharmaceutical Manufacturers' Association

/s/ Howard B. Fonda
Howard B. Fonda
President

/s/ Martin Lasersohn, M. D.
Martin Lasersohn, M. D.
Chairman,
Scientific and Research
Award Committee

History and Symbolism of the Naval Medical Corps Insignia

Daniel G. Miller, *Lieutenant, junior grade, MC, U. S. N. R. (1)*

EVER since the emergence of man into social groups he has used symbols with religious, mystical, or national connotations for veneration and inspiration. Medicine, from its deep preternatural roots has always been associated with characteristic symbols, some found almost universally in the ancient world. Nautical medicine may be traced back to the Phoenicians and Greeks who carried physicians aboard certain of their ships. Physicians of our Navy, descendants of these ancient seafaring physicians, have worn various symbols as medical insignia, and have changed these several times in the history of the Medical Corps. It is my purpose in this article to trace the evolution of the present medical insignia and examine its significance in the light of history and legend.

Naval uniforms in general made their appearance many centuries after armies had been entering battle in distinctive array. The Roman Legions were characterized by uniforms and Hannibal's Spanish troops wore crimson and white *(2)*. Roddis *(3)* stated that it is not surprising that the navies lagged behind in the adoption of uniforms, for in the confines of the relatively small ships each man was known to the other, and the need for uniform dress was less apparent. Schoonmaker *(4)* states that "Locker is the authority for the statement that as early as 1603 King James ordered his principal masters of ships to be always bravely attired in liveries of scarlet cloth embellished with velvet, silk lace, buttons, and gold embroidery. The first official

(1) U. S. Naval Mine Depot, Yorktown, Va.

(2) Todd, F. T.: Uniforms. In Encyclopaedia Britannica. Encyclopaedia Britannica, Inc., Chicago, Ill., 1951. vol. 21, p. 703.

(3) Roddis, L.: A Short History of Nautical Medicine. Paul B. Hoeber, Inc., New York, N. Y., 1941. p. 332.

(4) Schoonmaker, W. N.: Naval uniforms; origin and development. U. S. Nav. Inst. Proc. 58: 509-527, Apr. 1932.

mention of uniforms in the British Navy seems to be in the Jacobite's Journal in 1748," but these were for His Majesty's officers from admirals down to midshipmen, and uniforms for the men were not considered.

It is of value to include as ancillary information some of the changes that took place in naval uniforms in order to maintain the proper perspective on the development of the Medical Department insignia. Most of the material given below was found in the Department of Naval Records and History, National Archives. The first American naval uniform of which any record can be found is prescribed in a resolution of the Massachusetts Council of April, 1776, which "Resolved that the uniform of the officers be green and white * * *." Thus began an unbroken naval tradition for lack of explicitness in uniform regulations. In 1776 the Marine Committee of the Second Continental Congress issued the first official uniform regulations for the Navy. These provided that the officers should wear blue coats with yellow buttons, blue breeches, and a red waistcoat. It is notable that gold lace is absent, and this displeased many captains, including John Paul Jones, who favored a more elegant uniform. The officers wore what they pleased in spite of these regulations, and our infant Congress, gathering federal authority, passed this determined resolution *(4)* in 1781:

"That after the first day of January 1782, any officer whatsoever in the service of the United States, who shall wear on his clothes any gold or lace embroidery or vellum, other than such as Congress or the Commander-in-Chief of the Army or Navy shall direct, or who shall wear any uniform worn by the British Army or Navy, shall be cashiered from the service."

Naval affairs after the Revolutionary War were conducted by the Secretary of War. In June 1797 he issued regulations governing the uniforms of naval officers. They provided for a blue uniform with buttons of yellow metal having a foul anchor and an American eagle on them. The captains added gold epaulets to this simple uniform. When the Navy Department was established on 30 April 1798, it assumed the function of providing naval uniform regulations. In 1802 the second Secretary of the Navy issued uniform regulations more in keeping with the desires of the officers. The coat was elaborately trimmed in gold lace and had a row of buttons around the cuff. The uniform of the surgeons of that day was similar to that of the captains of the line. The essential difference between the two lay in the absence of gold lace and fewer buttons in various parts of the surgeons' uniform.

The uniform regulations of 23 November 1813 were not remarkable other than that gold lace was belatedly added to the surgeon's uniform and white pantaloons were prescribed as an alternative to breeches.

The latter, however, are of no moment because a monument in Trajan's Forum in Rome and various Persian seals (ca. 500 B. C.) show soldiers in baggy trousers (5).

In 1830 the oak leaf and acorn first appeared on naval officers' uniforms. Leaves of live oak, interspersed with acorns were embroidered on the collars and cuffs of all officers in greater or less degree, according to rank. The influence of this early custom is seen today on the visors of caps of officers of the rank of commander and above. Certain corps insignia were designated at that time to be worn with the oak leaves and acorns. Line officers wore a foul anchor and stars on their collars; pursers, a cornucopia. As a corps insignia, medical officers wore the staff of Aesculapius, which had first been introduced in 1826. Of this insignia, Roddis (6) said that it was disproportionately large, and "was probably the ugliest device ever worn, and a patient, especially if his gastritis had been induced by alcohol, would have been sorely distressed by the huge snake on the medical attendant's collar." The then Norfolk Naval Hospital in Portsmouth, Va., constructed in 1830, was probably the only naval hospital to have the benefit of serpent-bedecked medical officers because the use of this device was abrogated in 1832. In its place a branch of live oak was substituted and gold lace was added to the surgeon's cuffs.

The next uniform change was ordered in 1841. The uniform again became plain and, except for the surgeon's, lost most of the gold lace which had previously ornamented it. These regulations did not prove satisfactory, especially that part which provided only buttons on the cuffs of captains and commanders of the line, while the doctors had 3 stripes of gold lace. This latter was the distinctive mark of a Spanish colonel and in Spanish ports it frequently happened that the guard was turned out and full military honor was paid to the doctor while the captain passed by unnoticed (4).

In 1847, 5 years after the establishment of the Bureau of Medicine and Surgery, the lace on the cuffs of the medical officers was removed and sprigs of live oak substituted. In addition, they were to wear gold epaulets with the letters "M. D." in old English characters, done in solid silver and mounted on a crescent. The cap device was the same as that of the line officers, an oak sprig surrounded by a wreath of olive and oak. In September 1852, the "M. D." lettering was replaced by a sprig of olive. By this time the medical officer was a walking arboretum.

Regulations were issued in 1862 by which staff officers' uniforms were the same as those prescribed for the line except that the officers

(5) Devices and uniforms of the Navy Medical Corps, 1802-1905. U. S. Nav. M. Bull. 13: 505-513, July 1919.

(6) See p. 331 of footnote reference (3).

wore a plain rather than a foul anchor in the wreath of their caps and the star worn above the gold lace was omitted on the sleeves of the staff officer. Thus while a distinction was made between the staff and line, there was no insignia to distinguish the different corps. The various corps were again assigned insignia in January 1864. Officers of the Medical Corps wore a silver oak leaf in a vertical position within the gold wreath of their caps, but they did not wear the corps device above the sleeve stripes or on the shoulder straps as did line and other staff officers. Thus when the uniform regulations of 1866 specified that the cap ornament for all commissioned officers (except naval constructors, chaplains, and professors of mathematics) should consist of a silver eagle on a gold foul anchor, the medical officers were again left without any distinguishing device. They wore only the grade insignia which appeared also on the uniforms of other officers, both staff and line, with whom they had assimilated rank.

That these uniform changes, desultory as they may seem, were not easily come by is evidenced by the "feud" in the Navy Department during Civil War years between Secretary Welles who advocated "republican simplicity" and Rear Admiral Porter, representing the officers, who stated that "They would rather live on a smaller scale than to be deprived of a uniform which adds to their respectability." The issue was settled when Admiral Farragut, for whom this rank was created, was consulted in regard to his uniform. He suggested for his sleeve mark a large gold embroidered star with the representation of his favorite ship, the *Hartford,* in silver in the center. In addition, he was given gold lace which extended up to his elbows on his full dress coat *(4).*

In 1869 regulations were issued which prescribed a more uniform dress for both staff and line officers, but still left the medical officer without a corps device. Instead, while line officers wore the gold star above their stripes, staff officers wore colored cloth underneath their sleeve stripes in such a manner that it would show on each side and between the stripes. The color designated for the Medical Corps was cobalt blue.

The next change in Medical Corps insignia came in 1883 when the cobalt blue cloth was replaced by maroon velvet, and a distinctive device was introduced. This was a small Geneva cross of maroon velvet set within a silver Maltese cross. This was a combination of crosses, both of which had medical significance. The red cross of Geneva *(5, 7),* connoting immunity in battle for medical personnel, was adopted by the Geneva Convention in 1864. This convention was the result of a movement to improve the conditions of wounded soldiers in the field. The movement sprang from the publication in 1862 of a

(7) The Geneva Convention. In Encyclopaedia Britannica. Encyclopaedia Britannica, Inc., Chicago, Ill., 1951. vol. 10, p. 114.

book, Un Souvenir de Solférino, by Henri Dunant, a philanthropist of Geneva. In this book he described the suffering of the wounded in the Battle of Solférino so vividly that a great deal of public interest was aroused, and with the support of Queen Augusta of Prussia, and the Grand Duchess Maria Pavlovna of Russia, this general interest was channelized into a fruitful convention. The cross was taken from the flag of Switzerland out of appreciation for the part that republic played in organizing the first international effort to make warfare more humane. The Maltese cross (5, 8) was the emblem of the Knights of Malta. Many organizations grew up during or after the crusades to aid and comfort pilgrims to the Holy Land. The Knights of Jerusalem, known as the Hospitalers, was one of the larger and better organized of these groups, and from this order grew the Knights of Malta.

This device was used for only 3 years. In 1886 it was replaced by the present insignia, uniform regulations calling for "a spread oak leaf embroidered in dead gold, with an acorn in silver upon it." This corps device was worn on the epaulets, shoulder straps, and collars; it was not until 1919 that the dark maroon velvet under the gold stripes of medical officers was removed and the corps insignia placed just above the stripes, where it is worn today.

Other than our own Navy, few have a distinctive device for the medical corps. Medical officers in the Brazilian Navy wear an embroidered stethoscope above their sleeve stripes, and in the Netherlands, Yugoslavia, and the former German Navies, the staff of Aesculapius is worn similarly. In most other navies colored cloth is worn between the sleeve stripes to distinguish medical officers: for Great Britain, scarlet cloth; France, green velvet; Greece, purple velvet; and Italy, blue cloth. Naval medical officers in Russia wear a dark gray band piped with red on their caps, and similar collar tabs (9).

The various changes that have taken place in the Medical Corps insignia may be summarized as follows:

1776 to 1826	None.
1826 to 1832	The staff of Aesculapius.
1832 to 1847	A branch of oak.
1847 to 1852	The letters "M. D." in solid silver.
1852 to 1862	An olive sprig.
1862 to 1864	None.
1864 to 1866	A silver oak leaf within the wreath of the cap.
1866 to 1869	None.
1869 to 1883	Cobalt blue cloth between the gold sleeve lace.
1883 to 1886	The Maltese and Geneva crosses, maroon velvet between the gold lace.

(8) The Cross. In Encyclopaedia Britannica. Encyclopaedia Britannica, Inc., Chicago, Ill., 1951. vol. 6, p. 753.

(9) See pp. 336-337 of footnote reference (3).

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1886 to 1919 Oak leaf and acorn, maroon velvet.
1919 to the present Oak leaf and acorn.

Historical records do not reveal what significance or imaginative fancy lies behind the afore-mentioned changes in the Medical Corps insignia. We overreach ourselves to ascribe poetical connotations to many of the uniform traditions which had their origin in caprice or convenience. Many a seafaring man will wax eloquent on why, for example, the navy uniform is blue, but Schoonmaker *(4)* gives us what is probably the unpoetic truth, that it was taken from the riding habit of the Duchess of Bedford. Admiral Forbes, in 1746, was summoned to attend the Duke of Bedford. He was introduced to an apartment filled with various dresses, and his opinion was asked as to the most appropriate color. The Admiral said, "Red and blue, for they are our national colors."

"No," replied the Duke, "the King has determined otherwise, for having seen my Duchess riding in the park a few days ago in a habit of blue faced with white, it took his Majesty's fancy and he has appointed it for the uniform of the Royal Navy."

Naval metallic rank devices were no doubt adopted from the Army. In Army traditions the symbolism of these insignia has assumed legendary proportions and is expressed by this fanciful tale:

"The second lieutenant (corresponding to the ensign in the Navy) stands on the level ground looking up to his superiors at varying altitudes above him and starts to climb. His first step up corresponds to the first bar of the fence, giving him his first bar *(10)*, the lieutenant's bar * * *. The second step up to the top of the fence gives him his two bars as a captain (lieutenant in the Navy). From the fence he climbs to the oak, the tree of might and strength. It is a long climb and symbolizes the differences that exist between the company officer and the field officer. The gold leaf on the major's (lieutenant commander in the Navy) shoulder symbolizes this position. The next step is to climb to the tallest tree of the forest, the straight towering silver poplar which has no branches for many feet. At the top of this the lieutenant colonel (commander in the Navy) finds his silver leaves and looking up above him sees the soaring eagles, the insignia of colonel of the Army (captain of the Navy); and above the eagle the stars in the sky, the insignia of the highest rank in both the Army and the Navy." *(4)*

Rather than attempt to create a tradition by conjecture or poetry, we shall examine the oak leaf and acorn from the viewpoint of historical symbolism and heraldry and see then what conclusions may be drawn. Medicine and religion, both springing from a need for outside assistance, have always been and should be closely associated. In

(10) Silver. Lieutenant, junior grade, in the Navy.

ancient societies they were usually synonymous. The early priest-physician played a prominent role in those communities. Objects in nature which men felt could help them in their struggle for survival were revered. These objects, or symbolic representations thereof, were entrusted to the priest-physician whose profound wisdom might enable him to obtain for the worshippers the favor and assistance of the supernatural powers. It would follow then that whatever country would prevail in armed contest had the most potent gods, whose favor the defeated would endeavor to incur. Christians and Jews, however, in Western Civilization treasured their divine gifts beyond material gains or strength of arms. Their treasures, in the written word of both Testaments, have sustained these peoples with undiminished vigor though the swords of centuries have rusted. Medicine, however, does not progress by divine revelation. Rather we stand on the summit of the ages of wizardry, metaphysics, and empiricism through which our medical ancestors have travailed. It is with veneration that we preserve the symbols of the hundreds of physicians who earnestly ministered to the sick, and who in their day added to medical science even as we today stand at that ever receding but never ending frontier.

The staff of Aesculapius and the caduceus are two of the most commonly accepted symbols of medicine. The association of the oak leaf with medicine is not so generally well known although its roots are just as deep. The Red Cross of Geneva has been mentioned previously.

The serpent-entwined staff and the oak leaf symbolize certain vague groups of mystic or magical processes which in the cult of prehistoric men preceded medicine in our sense of the word but were certainly inclusive of it. The ubiquity of these symbols in ancient civilizations is remarkable. Much material on serpent worship is recorded by Fergusson *(11)* and Scheirer *(12)*. Early Babylonian figures show the caduceus not as an emblem, but as a god in itself; in others it is carried in the hands of gods or goddesses as a sign of supernatural powers. This staff in its oldest form was a rod ending in two prongs entwined into a knot. The Babylonian myths associated the serpent with wisdom just as the story of Genesis does. In India, serpents were held to be the progenitors of kings. The serpent was sacred to nearly all the gods, both Egyptian and Grecian. It represented immortality, owing perhaps to its periodic shedding of the skin; and eternity was typified by the snake swallowing its own tail. In various places the serpent represented knowledge and culture, shrewdness and wisdom, and freedom from disease. Some ancient groups felt that the human soul after death was re-embodied in a snake; others, that to eat a snake was to acquire powers of healing. The serpent was connected with all sorts of mysterious religious rites and closely connected with the healing arts *(5)*. We

(11) Fergusson, J.: Tree and Serpent Worship, or Illustrations of Mythology and Art in India in the First and Fourth Centuries after Christ. W. H. Allen & Co., Publishers to the India Office, London, 1873.

(12) Scheirer, G. A.: The Caduceus. Bull. U. S. Army M. Dept. 32: 26-33, July 1935.

have the biblical record *(13)* of Moses raising up a brazen serpent before the children of Israel to protect them against snakebite. Even in Christian times and among Christian nations this strange influence was felt. For example, as late as 1890, serpents were burned at midsummer festivals to ward off evil *(14)*.

In Greek mythology, Apollo, the sun god, carried a staff or wand which exercised influence over the living and dead. Apollo, first victor of the Olympic games, was not only a great athlete but was also god of the healing art, "Physician and Seer," "Health Giver," "Averter of Evil," and last but not least, "Physician of the Soul." Evidently Apollo found that his duties as a physician interfered with his sporting activities, and so he gave his wand to Mercury in exchange for a lyre. Mercury, while carrying this wand, came upon two serpents knotted together while fighting, and he separated them with his wand. Mythologists say that serpents were added to the staff at this time. A pair of wings was sometimes attached to the top of the staff in token of the speed of Mercury. Physicians today, we believe, would gladly give Mercury his caduceus in exchange for his winged shoes.

Aesculapius, Apollo's son, became the legendary Greek god of medicine. In the temples erected to him he effected cures and prescribed remedies. His daughter, Hygeia, was the goddess of health. While Aesculapius was treating a patient one day, a snake appeared and entwined about his walking stick, thus conferring on him the gift of wisdom and establishing the staff of Aesculapius as a classical symbol of medicine.

The caduceus of Mercury was first associated with medicine in the sixteenth century, when it made its appearance on the title pages of medical books. The first physician to employ the caduceus on his crest was Sir William Butts, physician to Henry VIII. In 1857 Army regulations directed that the caduceus be part of the insignia for hospital stewards. But it was not until 1902 that the caduceus was adopted as the insignia for the medical officers of the Army *(15)*.

Reverence of trees among early civilizations was just as widespread as that of serpents; and among trees, the oak was most frequently worshipped. Ancient documents give many examples of the esteem in which the oak was held for its religious significance and healing powers.

We read in Genesis *(16)* that when Abraham entered the land of Canaan, God appeared to him under an oak to promise possession of the country to his posterity. The Lord also appeared before Abraham

(13) Numbers 21: 6-9.
(14) Frazer, Sir J. G.: The Golden Bough. Macmillan Co., New York, N. Y. 1922. vol. 11, p. 38.
(15) The Caduceus. Bull. U. S. Army M. Dept. 41: 105-106, Oct. 1937.
(16) Genesis 12: 6, 7.

at the oak of Mamre *(17)*, at which time Abraham pleaded with the Lord not to destroy Sodom if so many as 10 righteous people be found there. The locations are translated in the King James version as the plains of Moreh and Mamre, but in the Hebrew it is oak. To show his subservience to God, Jacob buried all the graven images in his household beneath the oak at Shechem *(18)*. By the oak at Beth-El, Deborah was buried *(19)*. Joshua "took a great stone, and set it up there under an oak, that was by the sanctuary of the Lord" *(20)*. Again, beneath the oak at Ophrah, the angel of the Lord appeared to Gideon, telling him that he, Gideon, had been chosen by the Lord to save Israel from the hand of the Midianites *(21)*.

It would appear, therefore, that among the ancient Hebrews the oak was regarded as symbolic of the divine covenant, and some historians believe that by association it came to signify the divine presence. Barlow *(22)*, an authority on symbolism, stated that the Hebrew word, *allon*, which means oak also means oath, and that the root of this word, *al*, meaning mighty or strong, is the origin of the name of diety in many ancient tongues.

The Greeks, too, had a mystic veneration for the oak. Their supreme deity, Zeus, was said to dwell within the oak at Dodona, and the priests of the oracle gave forth their declarations on its leaves. Ovid, in a stirring passage in the Metamorphoses, relates the story of the plague of Aegina, telling how the king, Aeacus, standing beneath "a branching oak, the Sire's own tree, from seed of old Dodona sprung," makes an impassioned plea to Zeus to save his people from the plague or to let him die with them, and "the lofty oak trembled and moved its branches in the windless air." In ancient Rome, according to Livy, Jupiter was worshipped in the form of a lofty oak tree which grew up in the capital. Wood only of oak was used by the vestal virgins for their perpetual fire *(23)*.

Large oak forests covered Northern Europe at the dawn of history and these majestic trees exercised a profound influence on the people who dwelt in their shadows. The primitive Europeans, Frazer *(24)* tells us, lived among oak woods, used oak sticks for lighting their fires, and oak timber for the construction of their villages, their roads, and their canoes; they fed their swine on the acorns, and themselves ate acorns and made flour of it. No wonder then if the tree from which

(17) Genesis 18: 1.
(18) Genesis 35: 4.
(19) Genesis 35: 8.
(20) Joshua 24: 26.
(21) Judges 6: 11-18.
(22) Barlow, H. C.: Essays on Symbolism. Williams and Norgate, London, 1866. p. 88.
(23) Hazen, J. W.: The oak. In the Standard Dictionary of Folklore, Mythology and Legend. Funk & Wagnalls Co., New York, N. Y., 1950. p. 806.
(24) Frazer, Sir J. G.: The Golden Bough. Macmillan Co., New York, N. Y., 1922. vol. 1, pp. 353-356.

they received so many benefits should play an important part in their religion, and be invested with a sacred character.

Taara, the supreme god of the Finns and the Estonians, was associated with the oak, and the same is true of the Norse god, Balder, at whose death men, animals, and plants wept. The principal god of the ancient Germans was supposed to dwell by preference in the great oak at Romove, before which a sacred order of priests kept a continual fire of oak logs. The oak was veiled from view like the pictures in a modern continental church, and only shown from time to time to worshippers. The grove where it stood was so sacred that only the consecrated were allowed to enter, and no branch on it might be injured *(25)*. A vestige of the superstitious reverence for the oak in Germany is the custom of passing sick people or animals through a natural or artificial opening in the trunk of an oak for the purpose of healing them of their infirmities *(26)*.

Nowhere was the worship of the oak more developed than among the druids. Druidism was the religion of the Celtic inhabitants of Gaul, Britain, and Ireland up to the time of Roman conquest or in areas apart from the Roman influence, up to the time of the introduction of Christianity. Information concerning the druids comes from contemporary observers and from archaeologic investigations for the words of the druids are not extant. The druids of Gaul did not commit their learning to writing, holding that learning from the written word dulled the mind; they preferred to instruct their disciples over a score of years in the learning of some 20,000 verses by memory *(27, 28)*. Thus when the masters and the disciples fell before the onslaught of the Romans, the teachings were lost also. In Britain and Ireland, the druids kept written records, but these, too, were destroyed by the Romans and in subsequent efforts to establish Christianity on these islands. So great was their power that even St. Patrick implored God to protect him against their conjurations, and to stop the teachings of the druids, he destroyed 180 of their books *(29)*. Eventually all druidic literature was destroyed or lost.

The nature of the early history of druidism is open to conjecture, but Pokorny *(29)*, in a closely reasoned argument, stated that the druids were the priests or medicine men of the Neolithic aborigines of the British Isles, and at that time the oak was not holy to them. About the fourth or fifth centuries, B. C., the Celtic invasions of Britain took place and these Indo-Europeans assimilated with the aborigines.

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(25) Philpot, J. H.: The Sacred Tree, or the Tree in Religion and Myth. Macmillan Co., New York, N. Y., 1897. p. 44.

(26) See p. 371 of footnote reference *(23)*.

(27) Howard, J. E.: The Druids and Their Religion. Samuel Bagster & Sons, London, 1905. p. 22.

(28) Julius Caesar: De Bello Gallico 6: 16.

(29) Pokorny, J.: Origins of Druidism. Annual Report. Smithsonian Institution, Washington, D. C., 1910. pp. 583-597.

The great beauty and charm of the women of these aborigines, Pokorny avers, probably had a great deal to do with the fact that the Celts assimilated rather than held the aborigines as servile plebs as they did in other countries. With them the Celts brought oak and grove worship, and the druids soon amalgamated these practices into their own religion which remained dominant. It was a case of the conqueror being conquered by the women and the religion of the vanquished land. The function of the druids as physicians was closely connected with their calling as conjurers and prophets. One of their important ceremonies as priests and medicine men was described by Pliny the Elder:

"The Druids (so they call their wise men) hold nothing in greater reverence than the mistletoe, and the tree on which it grows so that it be an oak. They choose forests of oak for the sake of the tree itself and perform no sacred rites without oak leaves, so that it may be supposed that they get their name from the Greek word meaning 'oak'; but further, anything growing on oak trees they hold to be sent from heaven and to be a sign that the particular tree has been chosen by God himself. Mistletoe is, however, rather seldom found on an oak tree, and when it is discovered it is gathered with great ceremony, and particularly on the sixth day of the moon * * *. Hailing the moon in a native word that means 'healing all things' they prepare a ritual sacrifice and banquet beneath a tree and bring up two white bulls, whose horns are for the first time garlanded. A priest arrayed in white vestments ascends the tree and culls the mistletoe with a golden knife; it is caught in a white cloak. Then finally they kill the victims, praying to their deity to render propitious his gift to those on whom he has bestowed it. They believe that mistletoe given in drink will impart fertility to any animal that is barren, and that it it is an antidote for all poisons."

It might seem from the above that the mistletoe would be an appropriate emblem for the Medical Department—and while this would no doubt find much favor among many of the younger members of the Department, the far-reaching social implications, we are sure, would preclude the hasty adoption of such a device.

With the imposition of Roman civilization which followed their conquests, and the advent of Christianity, the nature of druidism changed. This change is accurately reflected in the change of the meaning of the word "druid." Contrary to the etymology suggested by Pliny, "druid" was derived originally from the Gaelic meaning "supreme, wise," revealing the reverence with which their lofty doctrines were held (29). However, their administrative and other civil functions were taken over by the Romans, who also physically destroyed and dispersed them; their religion was supplanted by Christianity, which forbade their teachings. Consequently in the early centuries of the Common Era they had so degenerated that the Gaelic *druidt*

stood for magician or sorcerer, and in later Welsh the word *druidecht* came to mean the arts of magic *(30)*.

After the decline of Rome, Britain was invaded in rapid succession by the Angles, Saxons, and Jutes, and by the time of the Norman invasion in 1066, the country was almost entirely converted to Christianity and all mention of druidism had virtually disappeared from British literature. But the old associations of things holy with trees and groves persisted in the minds of the people of Britain and France despite many edicts and canons condemning it *(31)*. Finally the Church adapted these practices to her own purpose *(32)*. Even today remnants of these ancient beliefs may be found in the customs of the people of Brittany and the British Isles. In Wales, some people believe that rubbing a piece of oak in the palm of the left hand in silence on Midsummer Day will keep them free from disease throughout the year. A nail driven into an oak, it is said in Cornwall, will rid a patient of a toothache. In Surrey, it is believed that certain tumorlike growths found on the trunks of oaks will guard against gout if carried in the pocket. Parkinson *(33)*, in his herbal, recommended a confection made from leaf galls to cure melancholy and sorrows arising from no evident cause. Barlow *(34)* stated that as late as the Eighteenth Century, "holy oak" was a common household word in England, and that oaks were synonymous with "gospel trees." Herrick *(35)* alluded to this in his Hesperides:

> "Dearest, bury me under that Holy-oake, or Gospel-tree,
> Where (though thou see'st not) thou may'st think on me
> When thou yearly go'st processioning."

In Germany as in England, the oak long remained a sacred tree; solemn assemblies were held beneath it and decrees were often dated *sub quercus* or *sub annosa quercu*. In Ireland today there are more than 1,300 places the names of which have "derry" in them. This is the anglicized *doire* or *daire* meaning oakwood *(29)*. It is not surprising then that the oak played a prominent part in the heraldry of the Middle Ages. The oak was the Scottish clan badge of the Cameron, Buchanan, and Stewart families. On an anonymous role of arms was written the following:

> "The shield is formed of polished gold, on which a ruby mascle glows;
> In this a honeysucklebold, its charm in native fullness shows;
> And in each corner of the chief —
> In base as well, in bold relief,
> An oak-leaf lies with bravery true
> Which nerves the heart of one who'd gain
> The bondage of affections chain."

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(30) Astley, H. J. D.: Biblical Anthropology. Oxford University Press, New York, N. Y., 1929. p. 178.

(31) Arles, 452; Tours, 567; Council at Nantes, 658; Toledo, 692; Canon of Edgar, 967.

Newton *(36)* in his work on heraldry stated:

"Of trees the oak is pre-eminent, as monarch of the forest. It is a symbol of strength and of long tried fidelity, which by its appropriation may figuratively imply the worthiness of the original bearer, or allude to the lands which have been bestowed upon him for his good services."

The oak tree is about 20 years old before it bears acorns. In folklore and legend the acorn is the symbol of prolonged effort preceding perfect achievement—an appropriate model of perfection for physicians. It was common medieval heraldic practice to adorn a leaf with the fruit of its plant or tree; any charge so decorated was said to be "acorned" of *englanté*. The acorn, therefore, also a symbol of fertility, was frequently placed on the oak leaf. The druids, it should be noted, ate acorns of the sacred oak in preparation for prophesying *(37)*.

In addition to its other connotations, the oak has a particular naval association. Rothery *(38)* stated that the oaks were honored among most nations and that the Greeks and Romans formed acorned oak branches into crowns and awarded them to the victors. Owing to the tree's suitability for boat building, it was particularly associated with naval exploits. In a dramatic passage, Tyas *(39)* exclaimed:

"If we do but remember the wooden halls of old England, we must allow that the oak has the first claim to be made the emblem of bravery. That tree bears no gorgeous flower, and its knotted and gnarled branches are not very traceable substances to be imported by the aid of the pencil to our shields. We are, therefore, compelled to content ourselves with the oak leaf, which may well represent the brave hearts of our countrymen who have maintained the supremacy of England over the wide waste of waters where they have been borne about by the tough timber which our noble forests have produced."

We have seen the association of the oak with medicine and religion in the heritage of our Western civilization as it grew and spread from ancient Palestine to Greece and Rome, from the Teutonic and Scandinavian peoples to the Celtic groups of France and the British Isles,

(32) See p. 180 of footnote reference *(29)*.
(33) Parkinson: Quoted in footnote reference *(22)*.
(34) See p. 92 of footnote reference *(21)*.
(35) Herrick, R.: To Anthea (in the Hesperides). In Moorman, F. W. (editor): The Poetical Works of Robert Herrick. Oxford University Press, New York, N. Y., 1921. p. 20.
(36) Newton, W.: Display of Heraldry. William Pickering, London, 1846. p. 138.
(37) Standard Dictionary of Folklore, Mythology and Legend, Funk & Wagnalls Co., New York, N. Y., 1949. p. 7.
(38) Rothery, G. C.: A B C of Heraldry. Cornhill Publishing Co., Boston, Mass. 1915. p. 121.
(39) Tyas, R.: Flowers and Heraldry. Houston & Stoneman, London, 1851. p. 181.

but more than that, the unique association of the oak with the hoary traditions of the sea is demonstrated. We may, therefore, conclude that the acorned oak leaf, with its proud and ancient ties with medicine and with the sea, is a valid and significant insignia for the Medical Corps of the Navy.

BOOK REVIEW

Biological Antagonism, The Theory of Biological Relativity, by *Gustav J. Martin,* Sc. D., Research Director, The National Drug Company, Philadelphia, Pa. 516 pages. The Blakiston Co., Philadelphia, Pa., publisher, 1951. Price $8.50.

The author of this volume has consolidated in a single text the theory of biologic relativity, the availability of which will place at the disposal of the pharmacologist, biochemist, and immunologist, a comprehensive metabolite analogue in the field of displacement that may lead to discoveries of chemotherapeutic agents of great value in medicine and its allied sciences. The book is well written and emphasis is placed on the pharmacologic aspects of this theory as early as chapter 2, in which the distinction between pharmacology and toxicology, as associated with chemotherapeutic agents altering enzymatic mechanisms, is clearly defined. In addition, due notice has been given to those agents altering enzymatic mechanisms associated with the parasympathetic and sympathetic nervous systems, those associated with histamine, and to biologic antagonism as it relates to the pharmacology of narcotics and hypnotics. Subsequent chapters of this book fully cover the physiologic similarity of the chemical products of metabolism. I believe the primary thought of the author throughout the book is to show that the metabolism of action of biologic antagonists, and more specifically of displacement compounds, is in the alteration of the kinetics of enzymes. This book should be available to the student and specialist alike as a reference work in the field of biologic antagonism and relativity.—*J. A. Keeney, Ph. G.*

Hemorrhage From the Nasopharynx

Edgar L. Olson, *Colonel, U. S. A. F. (MC)* (1)

ALTHOUGH epistaxis is usually not severe and is generally easily controlled, occasions have arisen when control of nasal hemorrhage has constituted a major problem. Deaths are rare from this cause unless the hemorrhage is of the angiomatous type, in which case the mortality is about 4 percent. Bleeding occurs most often from the anterior portion of the nasal septum, but occasionally originates from other sites such as that described in the case report which follows. This site was relatively inaccessible and produced an extremely profuse flow of blood. The measures necessary to control this hemorrhage were more drastic than those usually used to control epistaxis.

CASE REPORT

A 26-year-old woman was brought to the ear, nose, and throat clinic at about 1700 hours on 28 March 1951 with profuse bleeding from the nose and mouth. She appeared to have lost a great deal of blood. She had reported to the aid station in the area where she worked at about 1545 hours and was bleeding profusely at that time. The nurse's attempts to stop the bleeding were unsuccessful. A medical officer in the area was called. He packed both nasal chambers with vaseline gauze, but also failed to stop the bleeding. The nurse estimated that the patient had lost about 3 pints of blood by the time she was brought to the clinic as she had vomited a complete emesis basin of fresh clotted and unclotted blood. History obtained later from the patient revealed that she had had intermittent nosebleeds since childhood, but none severe enough to require medical attention, and that she had had a profuse nosebleed, lasting about 20 minutes, early in the morning of the day she was seen in the afternoon. The hemorrhage recurred in the afternoon quite suddenly and was so severe that she reported to the aid station within 10 minutes of the time of onset.

Examination on arrival revealed an extremely pale, anxious young woman, with cold, clammy skin, bleeding quite profusely from the nose and throat, with a weak, thready, and accelerated pulse. She was in

(1) United States Air Force Hospital, Wright-Patterson Air Force Base, Dayton, Ohio.

shock and was immediately removed to the operating room. The laboratory was asked to send a technician to the operating room to obtain blood for typing and crossmatching. After about 10 minutes spent in preparing the operating room, all nasal packing was removed. With difficulty, because of the profuse bleeding, the bleeding point was located on what appeared to be the left lateral or superior wall of the nasopharynx or both. The site of the bleeding point accounted for the previous unsuccessful effort to control the hemorrhage with nasal packing alone. A nasopharyngeal pack was inserted and both nasal chambers were repacked with vaseline gauze.

The nasopharyngeal pack was similar to those used for children after tonsillectomy and adenoidectomy. This type of pack is easily made by folding a 4 by 4 inch piece of gauze and trimming sufficiently so that it will exactly fit the nasopharynx to be packed. Strong black silk thread is used to tie the pack in a firm roll. Two long threads are attached, one to each end of the pack, to extend from each nares and another thread is attached to extend from the throat. The pack is inserted in the nasopharynx by first inserting a small rubber catheter through one nares into the pharynx and tying one of the threads to it and pulling it out the nose. This procedure is repeated on the other side. Then, while an assistant pulls on the two threads coming from the nares, the operator pushes the pack snugly into place in the nasopharynx. A piece of gauze should be placed over the columella before tying the two threads extending from the nares. The thread extending from the mouth is taped to the side of the face. When it is time to remove the pack, the thread at the columella is cut, and the pack is pulled out with the thread extending from the mouth. If the thread breaks, a curved Kelly hemostat is inserted behind the soft palate, and the pack grasped and removed.

This procedure immediately controlled the bleeding, and the patient was removed to the recovery ward. Because she had lost an estimated additional quart of blood, mostly vomited while she was in the operating room, an immediate transfusion of 500 cc. of blood and 1,000 cc. of 5 percent dextrose in saline solution were given. Seventy-five milligrams of vitamin K was given at once and 25 mg. every 3 hours thereafter. The patient's blood pressure was 104/70 and her pulse 96 soon after returning to the ward. By 2200 hours her blood pressure was 120/60 and her pulse 88. All packing was removed on the morning of the second postoperative day. Convalescence was without sequelas or complications. Laboratory findings failed to help in establishing a cause for the bleeding. The erythrocyte count was 3,410,000 and the leukocyte count was 15,700 with 82 percent neutrophils, 17 percent lymphocytes, and 1 percent monocytes. The hemoglobin was 14. The bleeding time was 2 minutes. The coagulation time was 3 minutes. The platelet count was 190,560. The prothrombin time was 16 seconds (control time 16 seconds).

The patient was discharged on 31 March and has been carefully examined twice since that time, the last time being on 14 May. No cause for the bleeding has been found and there has been no recurrence.

SUMMARY

This case is reported because of the unusual location of what appeared to be a nosebleed and to focus attention on the seriousness of some nosebleeds. The measures used to control the bleeding in this case may help to save a life in a similar emergency.

BOOK REVIEWS

Thyroid Function and Its Possible Role in Vascular Degeneration, by *William B. Kountz,* M. D., Assistant Professor of Clinical Medicine, Washington University School of Medicine; Director of Clinical Services, Division of Gerontology, Washington University School of Medicine and the St. Louis City Infirmary Hospital; Consulting Physician, Barnes Hospital and Lutheran Hospital, St. Louis, Mo. American Lecture Series Publication No. 108, A Monograph in American Lectures in Circulation. 62 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $2.25.

The author is of the opinion that too little interest exists regarding the role which internal metabolism and blood supply of the blood vessel wall plays in arterial degeneration. Hopeful of inspiring further research in this field, he presents the result of his 5-year study of patients in 3 age groups. Thyroid was administered to those patients with a low basal metabolic rate and an elevated blood cholesterol. The first group consisted of business executives whose average age was 55 years and in whom no or only moderate arterial changes were demonstrated. The second group were of an average age of 61 years and in most instances showed evidence of moderately advanced vascular disease. Many of these had symptoms which could be attributed to their vascular tree. The patients in the third group with an average age of 67.3 years, all showed an advanced vascular degeneration, both on clinical and laboratory examination. In the first group the incidence of vascular accidents, over a 5-year period, was less in the treated group. Coronary thrombosis occurred once in the treated group and 5 times in the untreated group, with 1 intracranial hemorrhage in this latter group. The total number of deaths during the period of observation was 3 in the untreated group and none in the treated. In the second group consisting of 160 patients there were 9 vascular accidents with 5 deaths in those treated and 10 vascular accidents, all fatal, in those not treated. In the third group 11 vascular accidents with 10 deaths occurred in those treated; 12 vascular accidents, all fatal, occurred in those not treated.

The author concludes that "the absence of thyroid substance in an organism plays an important role in the degeneration associated with arteriosclerosis." He logically admits, however, that other factors besides thyroid deficiency will produce the same type of degeneration, and that in the older group studied, thyroid did not appear to offer the same degree of protection as reflected in the younger groups. The younger groups appeared better protected from at least two manifestations of vascular degeneration associated with arteriosclerosis when given thyroid. Predicated on this observation the author based the indication for necessary study to establish the need for thyroid medication, as he believes the administration of the substance, in this age group "may be of importance in the protection of the vascular tree." In his concluding paragraph the author emphasized that "the evidence * * * indicates that hypofunction of the thyroid gland produces a degenerative change in the walls of the larger vessels," but that it is not the sole factor and that "other processes, particularly nutritional, may produce similar changes in the wall of blood vessels and result in arteriosclerosis."

This monograph is well documented by up-to-date references and illustrated by graphs, tables, and photomicrographs. This publication will prove of interest to any one interested in the cause of arteriosclerosis.—*Col. C. R. Mueller, MC, U. S. A.*

Modern Medication of the Ear, Nose and Throat, by *Noah D. Fabricant,* M. D., M. S., Clinical Assistant Professor of Otolaryngology, University of Illinois, College of Medicine, Chicago, Ill. Foreword by *Austin Smith,* M. D., Editor, The Journal of the American Medical Association. 245 pages; illustrated. Grune & Stratton, New York, N. Y., publisher, 1951. Price $5.75.

The author states that this book is intended to meet the day-by-day requirements of physicians interested in the practical applications of medications of the ear, nose, and throat. This objective has been attained admirably. The author has clearly and concisely summarized the basic anatomy, physiology, and bacteriology of each area under consideration. This is followed by a brief discussion of the pharmacologic principles involved and, finally, a discussion of the method of treatment of specific pathologic conditions of the ear, nose, and throat. At the end of each chapter a very good bibliography is presented. In his preface the author states "In an era of uncontrolled usage of antibiotics there is greater need than ever for intelligent therapeutics." Dr. Fabricant has succeeded in presenting a usable volume of intelligent everyday therapeutics and this volume will be of value to the physician who must treat the more common conditions of the ear, nose, and throat.—*Commander W. B. Larkin, MC, U. S. N.*

The Psychiatric Consultation

Warren J. Barker, *Lieutenant Colonel, MC, U. S. A. (1)*

THIS article is the result of a review of 250 consecutive consultation reports made at this teaching general hospital. These reports represented the work of 14 psychiatrists over a period of about 2 months. Although the written material on the reports did not lend itself to a valid statistical study, the review served to bring into focus a number of points which seem worthy of consideration and comment. Kohut *(2)*, Cushing *(3)*, and Watters *(4)* have written of the problems encountered in the referral situation in private practice, clinics, and hospitals. The aim of this article, too, is to discuss some of the dynamic interpersonal factors existing and unfolding between and among the patient, referring physician, and psychiatrist within the framework of the referral operation. Some of these factors, particularly the unconscious, sometimes irrational attitudes of the persons involved, are hardly ever exposed to view, yet their recognition and appropriate handling by at least the referring physician and psychiatrist can be of momentous significance in contributing to the success of the consultation.

Meaningful communication between 2 persons, resulting in mutually satisfactory and useful common understanding on any subject, no matter how seemingly neutral and impersonal, is at best a complicated, ill-understood, often laborious, process. When the subject under consideration is a person in distress the complexities appear to be enormously compounded. These generalizations lead us directly to the communication problem which confronts the referring physician, first in broaching the matter of referral to his patient, and second in making his referral request to the psychiatrist. The latter, in turn, will find his capacity for listening and understanding on trial in his interview with the patient and later his capacity for expression will be taxed in making his report to the referring physician. The opportunities for misunderstanding are

(1) Walter Reed Army Hospital, Washington, D. C.

(2) Kohut, H. (Chicago): Psychiatric consultations in a general hospital. Read at postgraduate conference in neuropsychiatry, Dixon State Hospital, Dixon, Ill., March 31, 1948.

(3) Cushing, J. G. N.: Role of psychiatrist as consultant. Am. J. Psychiat. 106: 861-864, May 1950.

(4) Watters, T. A.: Certain pitfalls and perils in psychiatric referral. Read at annual meeting of the American Psychiatric Association, Cincinnati, Ohio, May 8, 1951.

increased when in the next scene the referring physician attempts to communicate to the patient the psychiatrist's opinions and recommendations in a therapeutically effective way.

I have hinted at some of the complexities inherent in interpersonal communication, nonverbal as well as verbal, and of significant contributing attitudes, conscious as well as unconscious, rational as well as irrational, likely to be held by the 3 principals in the psychiatric referral. Let us consider some of these in more detail without presuming that thereby we will arrive at a simple, effortless, automatic system of referral. Rather, we will need to content ourselves with a few suggestions which both the referring physician and the psychiatrist may try in his own practice and confirm, modify, or reject.

THE REFERRAL

How can the patient be so prepared for psychiatric consultation that the chances of it being most meaningful are enhanced? It is safe to say that no matter what his expressed attitude may be, every patient will feel threatened to some degree by the prospect of being seen by a psychiatrist. The better the existing relationship between the doctor and the patient, the easier referral will be.

The attitude of the referring physician himself is of crucial importance. Physicians, like other human beings, have erected over the course of a lifetime more or less subtle and effective defenses against the emergence of disturbing, unwanted impulses from the unconscious mind, that subterranean reservoir of still active infantile wishes and fears. If these unwanted impulses approach awareness, anxiety—the painful warning signal—is generated. Various defensive attitudes against accepting the fact that emotional factors operate in himself or others—including hostility, contempt, denial, or even overestimation in respect to them—may be present and are likely to be communicated to the patient even before the matter of referral is actually broached. One can be sure that most patients are sensitive enough to discern the real attitude of others whether it is explicitly spelled out or not. So, when confronted with a patient who manifests poorly disguised instinctual tendencies and drives, or one who, in attempting to defend himself against them, is inappropriately helpless, demanding, ingratiating, or seductive, the referring physician's own defenses may be so threatened that the whole issue of dealing realistically and objectively with the patient becomes contaminated with his own emerging anxiety. Under these circumstances the referral may serve the referring physician as a riddance device, or become a plea for the psychiatrist to do something about the patient rather than something for him. It is apparent that unless the psychiatrist too has a good understanding of his own personality and has learned to deal effectively with his own unconscious he will fail to be objective and realistic and the patient's problems will not be understood or dealt with properly.

The patient may voice any of a variety of objections, usually rationalizations of anxiety, in order to avoid psychiatric consultation. The extent to which the referring physician reacts to these objections either by acquiescence, overzealous argument, or with realistic understanding, is of critical importance in regard to future developments in the case. Not infrequently then, and sometimes with reason, the patient may interpret the referral as a rejection by his physician, feeling that his physician thinks that he is "crazy," therefore unwanted. His reaction is likely to be one of anger, resentment, and hurt pride, no matter how well he disguises it.

Every person in distress seems to have a readiness to expect the worst and the best at the same time. Parallel to an attitude of fear and reactive hostility often entertained toward the psychiatrist there is usually a coexistent, covert attitude of awe, as if the psychiatrist is one possessed of mysterious and secret powers which may have benevolent aims if the patient is compliant, i. e., "good." Every physician, whether he be a psychiatrist or not, is a parent-surrogate to the "child" in his patient. This is a role he cannot avoid even if he does not fancy himself in it. The wise psychiatrist will understand both inappropriate hostility toward him and overestimation of him—extensions of infantile attitudes toward the parents—in the light of their defensive function, and will try to use them therapeutically. Both these attitudes are faces on the same coin and while only one may be visible, the other is nevertheless present. Although the propensity to hope for a magical relief from discomfort is latent in every patient, both the referring physician and the psychiatrist, no matter how well-meaning the motive, should be on guard against overselling the patient on the benefits to be expected as a consequence of the referral. There is another danger which may get the referral off to a poor start; this is the practice of referring to the psychiatrist with such euphemistic designations as "neurologist" or "nerve specialist." This device not only reflects the physician's anxiety but serves to reinforce the patient's need to believe that his illness is "organic" and has no connection with his inner, personal self or his intimate feelings toward significant people in his life.

Many of these difficulties inherent in the referral situation can be minimized if patiently, in good faith, and with a sincere wish to help the patient, the physician will discuss with him the reasons for referral. This discussion with an approach both cordial and frank can well begin with some general statements about the interrelatedness of emotions and physical sensations with specific examples within the realm of common experience such as reactions to fear or rage. This can be followed by explaining how in an analogous manner some of the patient's symptoms may have a similar origin and that the psychiatrist is one who makes a special study of such phenomena. Each physician will have his own technic in recommending referral and this will of necessity

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vary from patient to patient. More important by far than what he says is the way in which he says it; the patient will be influenced more by the "music" than by the "words." To repeat, the attitude of the physician is of crucial importance. Except in the case of the patient who is grossly out of contact with reality it is essential that this preparatory discussion take place. A referral arranged surreptitiously is damaging to the patient's pride, the physician's future value to the patient, and extremely damaging to the prospect of the psychiatrist being able to help. One can expect some patients to refuse psychiatric consultation even after the most considerate preparation and, except where legal or unalterable administrative conditions prevail, the matter may as well be dropped.

THE CONSULTATION

The problem of meaningful communication between the referring physician and the psychiatrist is not simple. Although it is the practice in most hospitals and clinics to send the entire clinical record as well as the formal written request for consultation to the psychiatrist before, or at the time of the consultation, there may still be some misunderstanding as to the purpose of the referral. As Kohut *(2)* has observed, even the best medical histories do not contain the real reasons for referral. The more information the psychiatrist has at his disposal the better will be his opportunities for contributing to the referring physician's understanding and to the patient's welfare. When clinical records, consultation requests, and consultation reports pass through the hands of a number of nonprofessional auxiliaries of the staff of a large hospital or clinic, as they must of necessity do, it is understandable that both the referring physician and the psychiatrist might find it discreet to refrain from reducing to writing important information of an intimate nature which might be damaging to the patient's best interests if known to any others beside the referring physician and the psychiatrist. This is particularly important when the referral is not required for administrative or disciplinary reasons. For reasons of confidentiality, as well as to clarify the necessarily brief written data, a telephone conversation between the referring physician and the psychiatrist, before as well as after the interview with the patient, has been found useful. The psychiatrist should see the patient as many times as are necessary before making final recommendations. In some instances, a further referral to the clinical psychologist for special tests may be indicated before the psychiatrist is able to render his best judgment in a given case.

As might be expected among patients referred from other services, "somatic" complaints will be prominent in most patients seen in consultation by the psychiatrist in a hospital or clinic. Outmoded as it is, the question is often raised as to whether or not the patient's complaints are "psychogenic," inasmuch as clinical and laboratory examinations have revealed no "organic" explanation for them. In reality, of course,

this "either/or" attitude is not consistent with the modern concept that the whole person reacts somatically as well as psychologically to noxious stimuli whether these stimuli are largely toxic, endocrine, infectious, mechanical, i. e., "organic," or whether they are largely psychologic. Emotional reactions to illness, whatever the predominant cause of that illness may have been at the onset, are to be expected in every patient. These should be anticipated by the physician as a matter of course. Wise understanding and handling can usually prevent them from reaching serious clinical proportions, and in most instances a referral to the psychiatrist will be unnecessary. When it is necessary the referral should be made early. Occasionally the psychiatrist is confronted with a patient who over a period of months has been the subject of a dogged and relentless search for an "organic" basis for his complaints. In this kind of situation, more often than not, the time has long since passed when a psychiatric consultation might have been most effective. Repeated tests and examinations tend to fix the idea in the patient's mind that he must certainly have a "physical" illness, probably a mysterious and fascinating one at that, and if so, he will resist the notion that emotions may have had any part in its genesis, or in its perpetuation.

It sometimes happens that the patient and his symptoms will arouse anxiety in the physician, which will cause the latter either to "forget" the patient, or to make him the object of overconcern so that he becomes, in effect, the victim of overtreatment. Either of these reactions on the part of the physician may result in unnecessarily prolonged hospitalization. The condition sometimes referred to in a jocular manner as "hospitalitis" is no myth and no joke. A monothematic, tubular concentration on the patient's organ systems, or even on his "psyche," may well result in neglect of the whole person and regression to chronic disability and invalidism will be facilitated.

RESULTS OF CONSULTATION

What can the patient, the referring physician, and the psychiatrist reasonably expect as a consequence of referral? The expectation of a quick, dramatic denouement and cure can hardly ever be gratified. As Jones *(5)* has pointed out, symptoms alone do not account for the patient's distress. More influential is the underlying anxiety which threatens to break through the failing defensive systems. Symptoms occur when defenses fail and must be considered as desperate stopgap measures to prevent the person from being overwhelmed by anxiety. So, although the patient may consciously want relief from his neurotic or "psychosomatic" symptom, he will unconsciously resist every effort to deprive him of it. This fact, when comprehended, cannot help but serve as a check on the unrestrained therapeutic ambition and overoptimism of referring physician and psychiatrist alike.

(5) Jones, E.: The unconscious mind and medical practice. In Papers on Psycho-Analysis. 5th edition. Williams & Wilkins Co., Baltimore, Md., 1948. pp. 351-364.

Naturally there is wide variation in the complexity and seriousness both of the underlying emotional conflict and the symptomatic manifestations of it. There are variations among different patients and variations in the same patient from time to time, and in differing emotional climates. Some symptoms are comparable in their discomfort to the pain attending the passage of a kidney stone, others to the annoyance of psoriasis. Some conflicts are comparable in their prognostic implications to cancer, others to chickenpox.

Not all patients can accept help from a psychiatrist. Fortunately not all those seen by him need his help. The psychiatrist can only evaluate the patient as realistically as his capacity will permit and then do the best he can with the resources available. The limitations of time alone make it impossible for the psychiatrist himself to treat every patient who is referred to him. If he attempts to do so only out of a sense of obligation to the referring physician or to his own conscience, or because he becomes sympathetically overidentified with the patient—all earmarks of the psychiatrist's own anxiety—he will soon find his energies dissipated and his effectiveness reduced to the point where he is of little real service to anyone. A great deal of misunderstanding and recrimination can be avoided if the psychiatrist will not promise more than he can accomplish. At the same time, he must be on guard against turning a patient away solely because the latter's problems are too close to those with which the psychiatrist himself is struggling in his own unconscious.

Among the therapeutic possibilities, long-term, intensive psychotherapy—psychoanalytic or quasi-psychoanalytic—which aims at the resolution of the underlying conflicts which give rise to symptoms is the most scientific, but, because of the time involved, as well as the inapplicability of the method to many types of patient, it is not often practical to undertake such treatment in the military setting. Even the psychiatrist whose special training qualifies him in psychoanalysis cannot, in addition to his other duties, work effectively with more than a few patients at a time in a thorough-going "uncovering" therapy. Brief psychotherapy and various supportive measures with limited therapeutic goals must often be the treatment of choice. This is not to imply that this kind of treatment is by nature more simple or less demanding of thorough and sound psychiatric consideration. In supportive therapy the psychiatrist has to know what defenses he is trying to strengthen and reinforce. This is possible only if he has a sound understanding of psychodynamics—his own as well as the patient's (*6*). Sometimes, in relatively few interviews the patient who is not so seriously incapacitated can be effectively helped or at least reconciled to minor discomfort.

A fact which can hardly be overemphasized is that in many cases where good rapport exists and there is willingness and understanding,

(*6*) Stone, L.: Psychoanalysis and brief psychotherapy. Psychoanalyt. Quart. 20: 215-236, Apr. 1951.

the referring physician himself may be the best source of help for the patient. When indicated and desired, the psychiatrist may act as supervisor of such therapy without any direct participation in the relationship between doctor and patient. The importance of this therapeutic avenue has been stressed by Cushing *(3)* and is in keeping with the spirit of SGO Circular No. 64 *(7)*.

Even if somewhat precocious, scientific psychiatry is young and can hardly claim an exclusive formula for assuring universal social harmony and individual happiness. In some instances manipulation of the environment will make it possible for the patient to make a better adjustment. For the patient in whom alcohol has become a serious personal and social problem, there should be no reluctance in recommending recourse to Alcoholics Anonymous. Other patients may find solace in religion or a "cause" of one kind or another.

THE CONSULTANT'S REPORT

As to the psychiatrist's written consultation report, it should begin with a statement of the patient's age, sex, and other identifying data. There should follow a recapitulation of the complaints and present illness. In addition there should be a description of the patient's mental status, and enough of the patient's history to show the main outline of his personality development in order to bring out the relationship, if significant, between his present illness and his habitual ways of reacting to people and to the vicissitudes of life. Certainly there should be comment on the original questions raised by the referring physician whether they proved to be vital or not. Peterson *(8)* has written of the special material which needs to be covered in the various reports requested for administrative reasons.

Psychodynamic considerations stated in straightforward and clear terms cannot fail to give the referring physician a better understanding of the patient and at the same time furnish a basis for understanding the rationale behind the psychiatrist's recommendations. The military psychiatrist must, however, bear in mind that his report, in the case of military patients, may be read before a Physical Evaluation Board, and in some instances may be made available to the patient's family, or even the patient himself, as provided by the law and regulations governing retirement for disability. Therefore it is probably wise to omit a discussion of those unconscious dynamic factors having to do with certain unacceptable (ego-alien) impulses when the report is likely to become, even in a limited sense, public. Assuming that formulations at this psychodynamic level are valid, they are nevertheless likely to be both disturbing and uninstructive to any but another psychiatrist.

(7) Office of The Surgeon General, U. S. Army: Postgraduate Short Courses for Medical Corps Officers at Military Installations. par. II 4a., SGO Circular No. 64, Apr. 25, 1951.

(8) Peterson, D. B.: Boards, certificates, and psychiatric reports. U. S. Armed Forces M. J. 2: 959-970, June 1951.

A diagnosis should be noted if one applies, but it must be acknowledged that a diagnosis if stated in static, descriptive terms does not tell the whole story or serve as a point of departure when further work with the patient is indicated. The report should end with a definite recommendation for the future handling of the patient whether that recommendation is positive and pleasing or not.

The purpose of the report either oral or written, is to convey ideas to the referring physician which he can understand and use in dealing with his patient. The psychiatrist will be forgiven if his revelations are something less than Copernican in significance, or if his recommendations do not seem to assure a Utopian solution, but the referring physician is justified in being annoyed if the psychiatrist is ambiguous or fails to indicate that he has given the problem the careful and mature consideration that it deserves. It sometimes happens that the psychiatrist may use such technical or stereotyped terms and phrases that his meaning is obscure. This employment of "trade jargon" does not reflect in the psychiatrist an advanced level of insight even though he may be under the impression that this is what is being displayed in his report. The referring physician will appreciate ideas expressed clearly and simply and above all, pertinently.

SUMMARY

A review of 250 consecutive psychiatric consultation reports has brought into sharper focus some of the more commonly encountered factors which are likely to be operative in the referral situation.

The patient can be prepared emotionally to accept the idea of referral if the reasons are discussed frankly and with understanding; if the patient can see that the referring physician himself is not made anxious by the patient's feelings and behavior which prompted the referral; and if the patient can believe that he is not being rejected or punished by the referring physician. The better the pre-existing interpersonal relationship between physician and patient the better are the chances for the referral being of maximum value.

Meaningful communication between the referring physician and the psychiatrist is similarly enhanced by a good pre-existing mutual understanding of each other's role and function. To further this understanding in relation to the problems of the patient, telephonic or vis-à-vis discussions before and after the referral are recommended. The referring physician, because he may be made anxious by the patient's reactions, should be on guard against "forgetting" him, or making him the victim of overtreatment. Referral, when indicated, should be made early.

Realistic expectations as a consequence of referral depend to a large extent on the realization that "functional" symptoms are in part defensive measures against the emergence of anxiety which threatens to overwhelm the patient and that, therefore, there is tremendous unconscious resistance on the part of the patient against relinquishing

his symptoms. Ideally, the psychiatrist should aim at helping the patient to uncover and resolve his underlying emotional conflicts. In practice, a briefer therapy aimed at strengthening the patient's defenses and diverting his energies into other channels is more often applicable in the military setting.

The written consultation report should be pertinent to the questions raised by the referring physician and to the significant facts in the patient's life which are believed to have a bearing on his illness. Specific recommendations and the rationale behind them should be spelled out clearly in nontechnical language.

BOOK REVIEWS

Phase Microscopy, Principles and Applications, by *Alva H. Bennett, Helen Jupnik, Harold Osterberg,* and *Oscar W. Richards,* Research Laboratory, American Optical Company, Stamford, Conn. 320 pages; illustrated. John Wiley & Sons, Inc., New York, N. Y., publisher, 1951. Price $7.50.

One of the factors which has retarded the wider application of phase contrast microscopy in medical research has been the absence of a book which would serve as both an introductory guide to the uninitiated and a reference text for the experienced. This need is now filled by this jointly authored work on phase microscopy which will probably constitute the standard "bible" on the subject for many years. Its appearance may indicate that the original problems of interpreting the optical images obtained by the phase method are no longer as great as they were 10 years ago.

Following a brief introduction to the scope and history of the subject, the book has an extended section on the elementary theory of phase microscopy containing both a qualitative explanation of phase difference and an examination of the visual effects produced by various types of refractive and absorptive deviation in light waves. The statement of general principles as theorems is helpful. The chapter on instrumentation covers general design and alinement of phase microscopes as well as descriptions of the various commercially available instruments. It concludes with a good discussion of variable phase microscopy.

The sections on technics of phase microscopy and phase microscopy in biology and medicine will be of most value to the medical investigator as they are thoroughly documented with photographic examples and highly detailed. Such information as the best media for mounting specimens and methods of photomicrography with phase contrast are included as well as complete citations of the biologic systems or materials which have been studied by phase contrast.

Industrial applications are treated separately. A final chapter, placed as an appendix, contains a technical development of the diffraction theory of phase microscopy with Kohler illumination and will be useful to the physicist or microscopist concerned with phase difference optics per se. The book has an excellent bibliography and is attractively printed on good paper. It will prove a useful textbook not only in laboratories where phase microscopy is practiced, but also where electron magnification methods are employed.—*J. Warren, Ph. D.*

The 1951 Year Book of Pediatrics (July 1950-June 1951), edited by *Henry G. Poncher,* M. D., Professor and Head, Department of Pediatrics, College of Medicine, University of Illinois, with the collaboration of *Julius B. Richmond,* M. D., Professor, Department of Pediatrics, College of Medicine, University of Illinois, and *Isaac A. Abt,* M. D., Editor Emeritus. 441 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1951. Price $5.

This book abstracts and reviews the pertinent pediatric literature which appeared during the last half of 1950 and the first half of 1951. The editors have made an excellent choice in the material selected for abstracting from the world-wide literature on pediatrics which has become enormous. The comments of the editors after many of the abstracts are pithy and provocative. The opening editorial highlighting the general trends in pediatrics is a succinct review of the present direction of pediatric thought and research. The introductory editorials for specific chapters are a valuable part of this book, because they are concise critical reviews of the latest advances and trends in the many fields concerned with pediatrics. The senior editor has stated that his policy is to provide concise, authoritative, up-to-date information which will be significantly useful to the practitioner. A perusal of this book will convince the reader that this policy has been carefully adhered to.

—*Commander T. E. Cone, Jr., MC, U. S. N.*

Surgery of the Stomach and Duodenum, by *Claude E. Welch,* M. D., Associate Visiting Surgeon, Massachusetts General Hospital; Clinical Associate in Surgery, Harvard Medical School. 349 pages; illustrated by *Muriel McLatchie Miller.* The Year Book Publishers, Inc., Chicago, Ill., publisher, 1951. Price $8.50.

To the surgical resident and the surgical practitioner who operate on the upper gastrointestinal tract but occasionally, this textbook of operative surgery will be most profitable. The book deals chiefly with technical maneuvers, all of which are illustrated by excellent drawings. All surgeons will be interested in the sections dealing with the difficult duodenal stump and the complications of gastric resection. Various well-qualified surgeons will differ with the author on some of his recommendations, but Dr. Welch points out in his preface that the recommended operations are those currently in use in the Massachusetts General Hospital. This volume is to be one in a series which should be a worthy addition to any surgeon's library.

—*Commander J. J. Timmes, MC, U. S. N.*

Multiple Laceration of the Auricle

George M. Cazan, Jr., *Lieutenant Commander, MC, U. S. N. R. (Inactive)*

FOR ages wounds of the pericardium and its contents were considered fatal. This belief prevailed until the latter part of the eighteenth century. Healed cicatrices in the hearts of persons with known previous precordial chest wounds were observed repeatedly at autopsy. This caused a few eighteenth century surgeons to take a skeptical attitude toward the prevailing belief. Ambroise Paré was one of the first to cite numerous instances of soldiers who survived hours after sustaining penetrating wounds of the heart, as later proved at autopsy. Other patients with cardiac wounds were being reported as living several days after injury.

Despite efforts to dispel the belief that all cardiac wounds were necessarily fatal, any attempt to enter the pericardial cavity was condemned by the medical profession. In 1826 an heir to the French throne (Duc de Berry) was stabbed in the heart by an assassin. Dupuytren, his surgeon, was severely reprimanded after keeping him alive several hours by relieving the tamponade with a probe periodically introduced into the wound. Today, pericardial decompression is not only a frequent pre- and a post-operative necessity but is advocated as a definitive therapeutic procedure. Paré predicted that some day suture of the human heart would be successfully accomplished. It was not until 1895, after Del Vechio successfully sutured the heart in a series of dogs, that the procedure was attempted on a human being. This attempt was unsuccessful but in 1896, Rehn reported the first successful suture of the human heart. Similar pioneering efforts quickly followed.

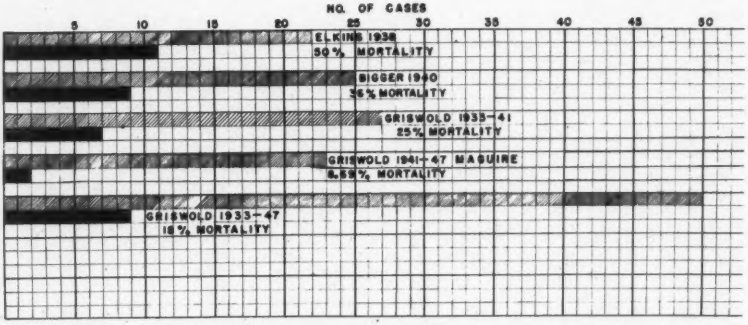
INCIDENCE

Elkin *(1)* in 1938 and Bigger *(2)* in 1939 reported a 50 percent mortality from this operation in the United States. Subsequently, Bigger

(1) Elkin, D. C.: Diagnosis and treatment of wounds of heart; review of 22 cases. J. A. M. A. 111: 1750-1753, Nov. 5, 1938.

(2) Bigger, I. A.: Heart wounds; report of 17 patients operated upon in Medical College of Virginia hospitals and discussion of treatment and prognosis. J. Thoracic Surg. 8: 239-253, Feb. 1939.

(3) and Griswold and Maguire (4,5) have reported additional cases. Figure 1 illustrates the progressive decline in the mortality rate following surgical intervention in this type of injury. About 95 percent of the patients studied (fig. 1) were Negroes. They were treated in southern hospitals where about 50 percent of the patients are Negroes; where 1 in every 1,000 surgical admissions is for a traumatic heart wound; and where 2 in every 100 wounds of the chest involve the heart. These injuries were most common in patients between the ages of 20 and 40 years. The ratio of men to women was 4:1. Alcoholic intoxication was associated with this type of injury in a significant number of patients.



Shaded areas = Patients operated on. Solid areas = Operative deaths.

Combined mortality rate = 30.5 percent.

Figure 1. Diagram of the surgical mortality rate for four series of patients whose cardiac wounds were sutured.

ANATOMIC CONSIDERATIONS

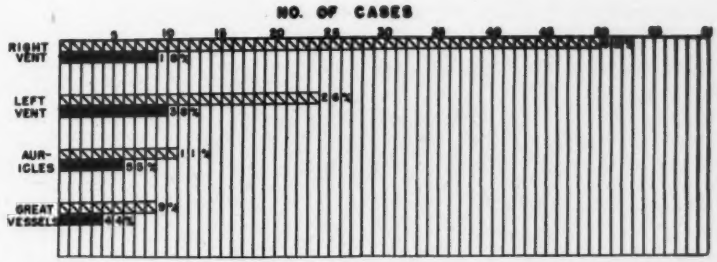
Anteriorly, the pericardial sac lies behind the body of the sternum, one-third lying to the right of the midline and two-thirds to the left. The internal mammary arteries lie 1 finger's breadth from the border of the sternum, and the right and left phrenic nerves are found on the anterolateral aspect of the pericardial sac. All of the contents of the pericardial sac are exposed to the chest wall anteriorly, but the area of exposure differs with the various structures; 55 percent of the anterior surface area is right ventricle; 20 percent left ventricle; 10 percent auricles; 10 percent great vessels; and 5 percent vena cavas. These figures coincide with the incidence of involvement of the structures in the pericardial sac (fig. 2). This is fortunate because the mortality rate

(3) Bigger, I. A.: Diagnosis and treatment of heart wounds, with summary of 25 cases. South. M. J. 33: 6-11, Jan. 1940.

(4) Griswold, R. A., and Maguire, C. H.: Penetrating wounds of heart and pericardium. Surg., Gynec. & Obst. 74: 406-418, Feb. (no. 2A) 1942.

(5) Maguire, C. H., and Griswold, R. A.: Further observations on penetrating wounds of heart and pericardium. Am. J. Surg. 74: 721-731, Nov. 1947.

is highest in wounds involving the thin flabby and friable walls of the appendages and lowest in the thick and muscular walls of the ventricles (fig. 2). The body of the sternum is a natural protective barrier for the right coronary artery. Several instances of injury to the left coronary artery are on record. None of the structures in the pericardial sac, however, can be considered immune to injury. Furthermore, the pericardial contents can be reached from a wound of entrance anywhere on the chest wall or from the upper abdomen. All wounds of the chest should be investigated to determine whether any of the structures of the pericardial sac are injured. The mortality rate is lowest in needle and ice pick wounds and highest in gunshot wounds. Most of the latter do not reach a treatment facility.



Shaded areas = Patients operated on. *Solid areas = Operative deaths.*

Figure 2. Diagram showing the incidence of involvement of the structures in the pericardial sac.

CASE REPORT

An 18-year-old Negro was admitted to the Clark County General Hospital of Las Vegas, Nev., with a stab wound of the anterior chest wall inflicted with a switch-bladed pocket knife. He was alert, conscious and not bleeding externally on admission. Shortly afterward, symptoms of shock without external bleeding developed and he received symptomatic treatment. When first seen by the surgeon, he was conscious but in a state of shock with no perceptible pulse or blood pressure. His heart sounds were faintly audible at the rate of 40 per minute and respirations were shallow at 10 per minute. A stab wound measuring 1/2 inch in length was present over his fourth left costal cartilage. His neck vessels were not distended. Fluoroscopy revealed a somewhat enlarged cardiac shadow with feeble and slow pulsations. He was taken to the operating room where his venous pressure showed no elevation.

Anesthesia was induced with oxygen and cyclopropane and carried to the third stage with ether and oxygen. A T-incision was made with the horizontal and vertical limbs intersecting at the site of the stab

wound (fig. 3). The flaps were reflected and the fourth and fifth costal cartilages were resected. After ligation of the internal mammary artery, a portion of the left sternal border was removed to provide a better exposure. At this point the cardiac pulsations ceased. The pericardial sac was immediately opened with extension into the left pleural cavity resulting in collapse of the left lung. About 75 cc. of liquid and clotted blood was found posterior to the quiescent heart. The heart was gently and at regular intervals massaged between the fingers and the thumb. After about 8 seconds, contractions began and continued at a regular rate. At this point, bleeding was noted from a linear wound 3/8 of an inch in length on the anterior surface of the left auricle.

Figure 3. Photograph showing the incision.

Two horizontal mattress sutures of No. 000 black silk were placed through the entire thickness of the auricular wall but bleeding continued from beneath the auricle. A second similar wound on the posterior wall of the auricle was found and closure was effected with two additional mattress sutures. The flow of a previously arranged transfusion was started at this time and all blood and clots were removed from the pericardial sac. Almost immediately after closure of the auricular wall openings, the peripheral pulse was detected at a rate of 84 per minute and a systolic pressure of 110 was reported.

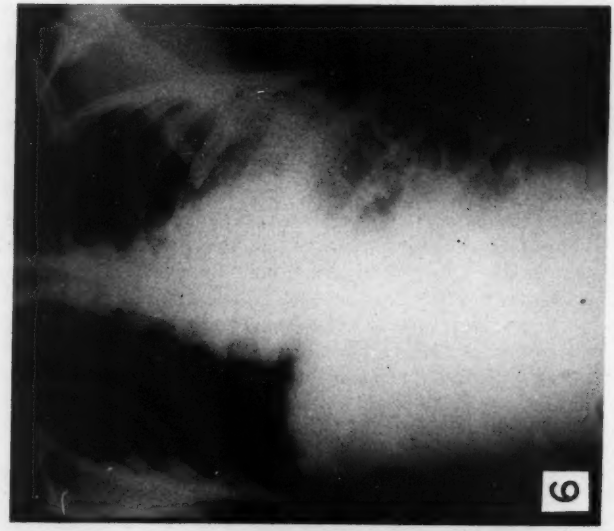
An opening was made through the dependent portion of the pericardial sac communicating with the left pleural cavity for drainage purposes. The left lung was reinflated and closure of the wound was effected with interrupted black silk sutures of the muscular flaps, subcutaneous tissue, and skin. The patient's postoperative condition was fairly good; his pulse was stable at a rate of 96 and his blood pressure was 112/74.

He remained fairly comfortable for 15 hours. A roentgenogram of the chest made 12 hours after operation revealed (1) cardiac decompensation with probable pericardial fluid; (2) pulmonary congestion and edema bilaterally, more marked on the left side with fluid in the left

pleural space; and (3) a large collection of gas in the stomach and splenic flexure of the colon. Thereafter, respirations became more rapid and labored. A roentgenogram taken 36 hours after operation (fig. 4) revealed an increase in the generalized pulmonary congestion; an increased amount of fluid in the left pleural space; and upward displacement of the diaphragm on the left side by gas in the stomach and splenic flexure of the colon. The patient was digitalized and positive pressure breathing was started using a pressure demand oxygen regulator such as is used in high altitude flying (fig. 5). Within 24 hours his breathing was greatly improved. His blood pressure was 110/70.

A roentgenogram of the chest at this time (fig. 6)revealed (1) marked decrease in the bilateral pulmonary congestion, (2) reduction in the size of the heart shadow, (3) fluid still present in the left pleural space with obscuring of the diaphragm on the left, and(4) less gas under the left leaf of the diaphragm. A thoracentesis in the left posterior axillary line was performed and 600 cc. of thin serosanguineous fluid was obtained. A roentgenogram taken 1 hour later showed some clearing of the lung field on the left and a definite fluid level (fig. 7). The patient continued to improve and a roentgenogram taken on the twelfth postoperative day showed continued absorption of this pleural exudate (fig. 8). He was allowed to be up for short periods 1 week later.

ECG's made on the day of operation (fig. 9) revealed changes consistent with injury to the anterior surface of the heart. The RST segment was elevated in leads I, II, and III. On the fourth postoperative day, the electrocardiographic findings were those of an epicarditis and pericarditis (elevation of RST segment in leads I and AVL), and by the twelfth postoperative day the tracings were normal. A roentgenogram taken on the forty-ninth postoperative day revealed a normal cardiac shadow and clear lung fields (fig. 10). The patient's heart was functionally normal and he was discharged on convalescent leave. Thirteen months after injury, he was examined in the outpatient clinic of an Air Force hospital outside the continental United States because of sharp, shooting pains in the chest after heavy lifting and deep breathing. He seemed apprehensive of receiving an accidental blow against the anterior chest wall. He weighed 148 pounds as compared to 161 before injury. Physical examination revealed easy fatigability after heavy exercise and visible regular cardiac pulsations beneath the healed surgical scar. The subcutaneous tissues overlying the area from which the costal cartilages had been removed were noted to retract almost 2 cm. with each forced inspiration. There was no enlargement or displacement of the cardiac border. The heart tones were good; the rhythm was regular; there were no adventitious cardiac sounds; and the blood pressure was 112/68. Roentgenographic and fluoroscopic reports, with and without barium, revealed no abnormality in the cardiac contour or abnormal pulsations. The pulsation on the anterior chest wall appeared to be a transmitted pulsation. No local chamber enlargement or aneurysmal dilatation could be noted. There was some



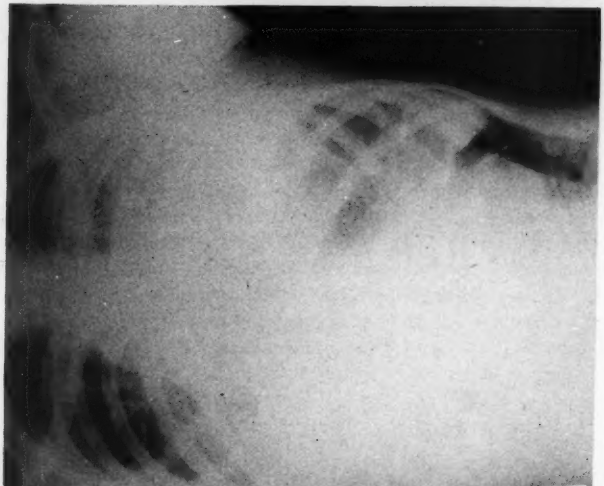


Figure 4. Roentgenogram of the chest taken 36 hours after operation. Figure 6. Roentgenogram of the chest taken 24 hours after that shown in figure 4.

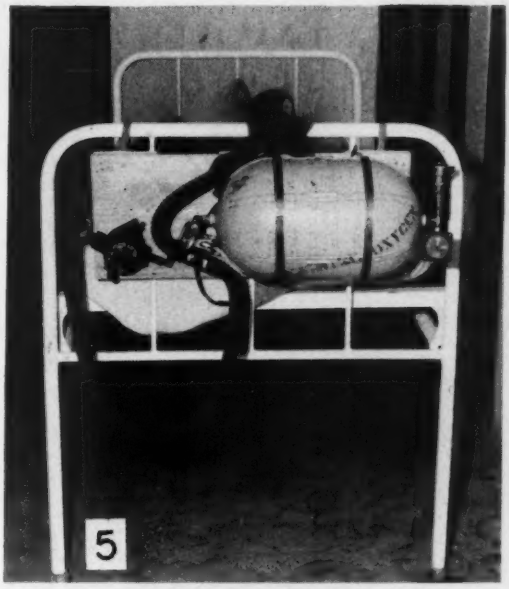


Figure 5. Pressure demand oxygen regulator and high altitude mask.

blunting of the left costophrenic angle. EKG's revealed no evidence of myocardial damage. Shifting of the S-T segments were noted and interpreted as probably due to a healed pericarditis. It was believed that the patient's symptoms were probably due to a paradoxical motion of the soft tissues overlying the surgical absence of the costal cartilages on the anterior chest wall and adhesion of the pericardium to the parietal pleura. It was recommended that an external protective device be worn at all times. Psychologic factors undoubtedly played some part in producing this man's symptoms. He had no significant disability.

DISCUSSION

The physiopathology and management of penetrating wounds of the heart have been extensively described by Beck (6), Bigger (2,3,7), Elkin (1,8,9), Maguire and Griswold (4,5), and others. The immediate causes of death in these injuries have been attributed to (1) internal or external exsanguination, (2) involvement of a major coronary vessel,

(6) Beck, C. S., and Cox, W. V.: Effect of pericardiostomy on mechanics of circulation. Arch. Surg. 21: 1023-1039, Dec. (pt. 2) 1930.

(7) Bigger, I. A.: Wounds of heart and pericardium; report of cases and summary of literature of sutured heart wounds. South. M. J. 25: 785-794, Aug. 1932.

(8) Elkin, D. C.: Emergency surgery of heart. Am. J. Surg. 46: 551-561, Dec. 1939.

(9) Elkin, D. C.: Suturing wounds of heart. Ann. Surg. 95: 573-577, Apr. 1932.

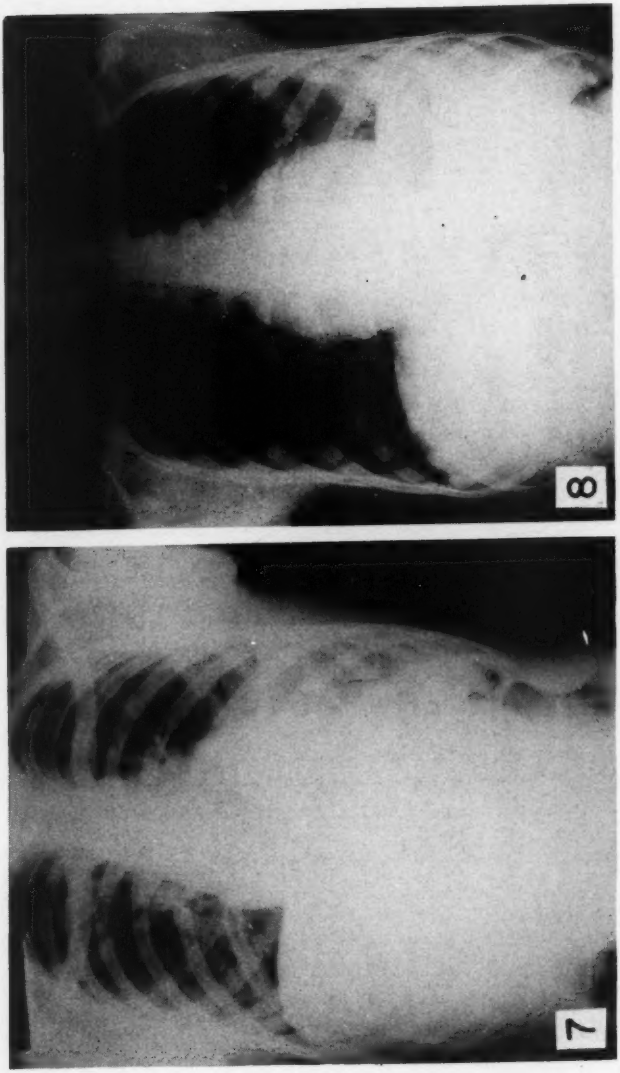
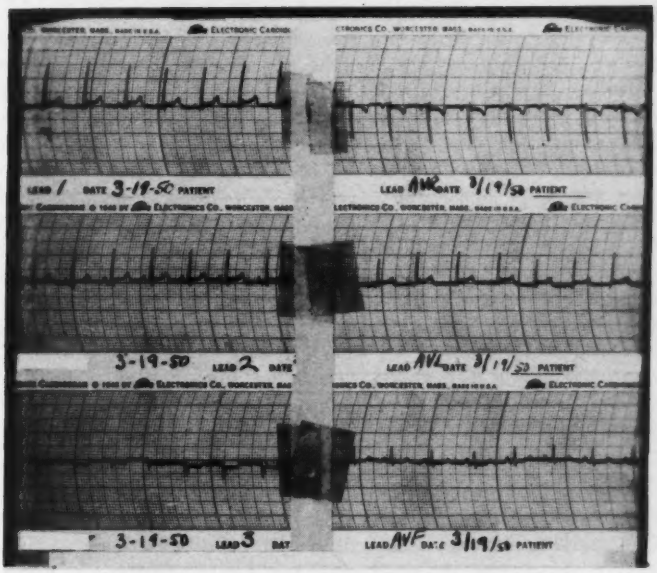


Figure 7. Roentgenogram taken 1 hour after that shown in figure 6. Figure 8. Roentgenogram taken on twelfth postoperative day.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3-19-50 LEAD 3 DAT
LEAD AVF DATE 3/19/50 PATIENT

Figure 9. ECG's made on the day of operation.

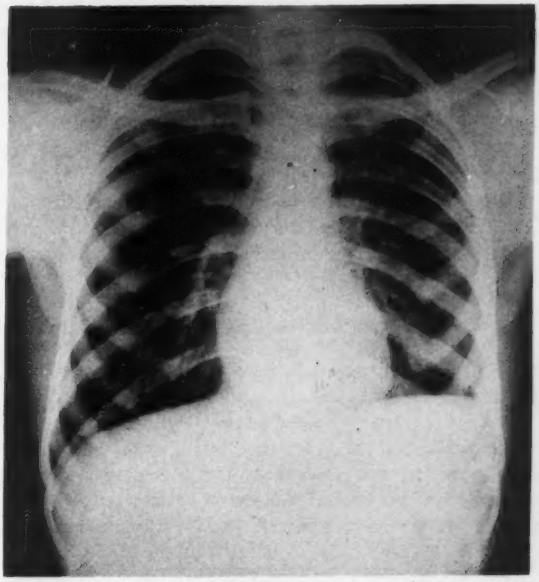

Figure 10. Roentgenogram taken on the forty-ninth postoperative day.

and (3) tamponade. Death is usually rapid with exsanguination and coronary vessel injury and these patients do not generally present themselves for surgical intervention. Tamponade, on the other hand, can develop rapidly or gradually depending on the location and type of wound and size of the pericardial rent. The diagnosis is not difficult. There is a chest wound, shock, and a slow and quiet heart despite a falling systolic and a rising diastolic pressure. Elkin stated that he relies on distention of the neck vessels more than anything else as an indication of tamponade. If time permits, venous pressure readings will show an elevation corresponding to the degree of tamponade. Maguire and Griswold state that rapidly forming tamponade may occur with the escape of as little as 200 cc. of blood. My patient presented a penetrating wound of the heart with two openings into the left auricle. Death would have ensued without surgical interference. There was no involvement of a coronary vessel and no exsanguination. At the same time, such findings of tamponade as elevated diastolic and venous pressure and distention of the neck vessels were lacking. This was accounted for at the time of operation by the fact that only about 75 cc of blood was found within the pericardial cavity.

What then, was the mechanism that led to cardiac arrest in this patient? I believe that the following sequence of events transpired. The extensive openings in the auricle allowed blood to escape into the pericardial cavity more readily than into the left ventricle. Ventricular filling failed because of the shunting effect through the auricular wounds. The contractions of the heart brought almost no blood to the intracardiac circulation and a primary decrease in cardiac output resulted. Anoxia of the heart muscle developed. The absence of blood delivery to the right side prevented tamponade and its embarrassing effects from developing.

Another interesting physiologic mechanism demonstrated in this case was the effectiveness of positive pressure breathing in a patient with pulmonary edema due to cardiac decompensation. The results in this patient were dramatic clinically and roentgenographically. It is doubtful that digitalis alone could have produced such a rapid response.

A third feature of this case was the successful repair and healing that was effected without the use of special clamps and without the use of anticoagulants Because of the friability of the auricular walls, the principal difficulty encountered in repair of these wounds is hemorrhage and mural thrombosis with secondary emboli. No difficulty was experienced in suturing this patient's heart without clamps and without the use of anticoagulants. The horizontal mattress sutures of fine black silk minimized the tendency for bleeding along the everted suture line and also prevented exposure of the suture material within the endothelial cavity of the heart. Mural thrombi were thus avoided.

Medical Service in the Air Defense Command

Arthur J. Donneson, *Major, U. S. A. F. (MSC)*

THE primary mission of the Air Defense Command of the United States Air Force is the development of sufficient forces to protect the continental United States against enemy air attack. The great importance of this responsibility for the security of our Nation is believed to justify this brief report on the medical service of this Command which, since January 1951, has held the status of a major Air Force command. Under the Air Defense Command the United States is divided into 3 air defense forces, each of which is further subdivided into air divisions. These are designed to control the air-raid warning systems, and to exercise command over all air defense activities during an alert or attack, including the operational control of the fighter wings.

The conduct of the medical service in the Air Defense Command presents a wide range of problems covering medical care in installations from large, well-equipped, fully staffed hospitals to isolated, one-room dispensaries located 40 or 50 miles from the nearest community and operated by a single airman. Since June 1950, when the Korean conflict started, there has been a constant and impressive expansion of facilities in connection with the increased importance of the air defense mission. With the establishment of each new base or separate activity, medical service has to be provided. Critical shortages of all categories of Medical Service personnel and lack of experience on the part of those available led to problems and difficulties. In many instances young medical officers with little or no prior military experience found themselves assigned as base surgeons, responsible for establishing and operating hospitals and infirmaries. Assistance was given them by the air surgeons of the 3 air defense forces, Headquarters, Air Defense Command, Colorado Springs, Colo., and medical depot liaison officers who offered guidance in obtaining adequate supplies, installing x-ray and other technical equipment and establishing proper supply accounts.

As additional officer and airman personnel became available, an intensive on-the-job training program was instituted, in addition to the

placement of many airmen in medical service schools. Cadres were established at each hospital in the Command and were trained so that they could be reassigned to new bases to establish the medical service. Trained airmen set up pharmacies, laboratories, and x-ray services. Flight surgeons' offices, out-patient clinics, wards, messes, and administrative activities were rapidly and efficiently established when required where adequate buildings were available; otherwise local arrangements were made for medical attendance at nearby military, other government, or civilian medical activities. The value of trained cadres during any projected expansion period cannot be overemphasized.

One of the most difficult problems associated with the Command medical service was that imposed under the Aircraft Control and Warning Program. For thousands of miles along the borders of the United States there lies an integrated net of radar warning stations. Each is a complete, modern installation with highly trained personnel assigned to operate the radar and communications equipment as well as for the usual administrative functions. Under the air defense forces, specified geographic areas are placed under the jurisdiction of various air divisions. The divisions control certain aircraft control and warning groups, which, in turn, administer the squadrons operating the sites. As it is usually uneconomical and undesirable to keep a full-time physician or dentist at an aircraft control and warning squadron, these officers are assigned at group or division level, but are responsible for proper medical service at the aircraft control and warning sites.

In order to maintain an integrated radar network, many sites are located in relatively isolated areas at great distances from even small communities. An unpaved road is often the only means of access aside from use of a helicopter. Mosquito control and water supply present a recurrent problem at some installations. At practically all isolated sites, primary medical care is furnished by an airman medical service supervisor who is qualified by training and experience for such duty. Wherever possible, the services of a part-time civilian physician are used. The evacuation of patients from isolated sites is tedious and difficult. Currently a jeep is authorized and used, but a recommendation has been made that it be replaced by one of the standard field ambulances, which are now being furnished to all sites as rapidly as possible.

During the winter months some aircraft control and warning sites are snowbound for varying periods and evacuation of patients by helicopter is occasionally necessary. Recommendations have been made for the permanent assignment of helicopters to certain air divisions in order to evacuate patients and obtain supplies under emergency conditions. Pending approval, the Air Sea Rescue Service and other agencies having helicopters are furnishing support wherever possible.

Dental service also poses a problem at the aircraft control and warning sites. Isolated installations are supported by "circuit riding" dental

officers using a Dental Chest No. 60. At the far northern sites, dental care must be given during the late spring, summer, and early fall because the roads are often impassable at other times.

Early in 1950, a study indicated that the equipment in Dental Chest No. 60 was not adequate, and that the installation of a one-chair clinic for the visiting dental officer warranted consideration. It was decided that the cost of these clinics would be prohibitive, and that a number of mobile clinics would be more practical and more economical. After studying the designs and specifications of numerous mobile units built for use by the United Nations, foreign governments, and various private agencies, a completely new mobile clinic was designed with the assistance of the Armed Services Medical Procurement Agency. This vehicle, hauled by a prime mover, incorporates the best features of all the designs studied. It is a two-chair clinic, including x-ray equipment and a small but complete dental laboratory. Two standard instrument cabinets, plus many built-in cabinets, provide sufficient storage space for a 3-month level of dental supplies. The vehicle is air-conditioned and is supplied with power and air for the dental units by means of an installed gasoline generator and compressor.

Eleven of these dental trailers are currently being manufactured. Manned by two dental officers, a dental laboratory technician, and a dental assistant, each will visit aircraft control and warning sites, remaining long enough to provide dental care for the assigned personnel. Prosthetic appliances will be made and fitted before departure of the mobile clinic for the next site. Designated parent bases will replenish supplies in the same manner as for the dispensaries operated at the sites.

At Headquarters, Air Defense Command, as well as at the three air defense force headquarters, constant and careful studies are being made by the air surgeons and their staffs covering all phases of medical activity in the command. Staff officers make frequent visits to the medical facilities to determine the adequacy of personnel and equipment, and to discuss special problems. Close coordination with officers in charge of construction at all echelons is maintained and has resulted in an improved building rehabilitation program and much new construction. The problems of dependent care are given particular attention, and wherever possible, medical personnel and facilities are made available within the limitations imposed by the military workload. Recommendations from all personnel are encouraged and are given careful consideration. Expansion of medical facilities in the Air Defense Command has kept pace with the rapid expansion of other activities in the Command. The medical service will continue to provide the support required under any new expansion program as long as the principles of economy in the use of available manpower, judicious planning, and adequate training are adhered to. Under such policies there should be constant improvement in the medical service.

BOOK REVIEW

Chronic Disease and Psychological Invalidism, A Psychosomatic Study, by *Jurgen Ruesch,* M. D., in collaboration with *Robert E. Harris,* Ph. D.; *Carole Christiansen,* M. A.; *Susanne H. Heller,* B. A.; *Martin B. Loeb,* B. A.; *Salley Dewees,* M. S.; and *Annemarie Jacobson,* M. D. Foreword by *Karl M Bowman,* M. D. 191 pages. University of California Press, Berkeley, Calif., Publishers, 1951. Price $3.50.

"Modern psychiatry needs the integration of descriptive psychiatry, psychometrics, and psychodynamic theory." Toward that end, Dr. Ruesch and his colleagues at the Langley Porter Clinic and at the University of California Medical School have made an important contribution to psychosomatic medicine through their study of chronic illness and delayed recovery. This book is a report of that study, conducted on patients with physical symptoms which had persisted for an undue time beyond that which they could reasonably have been expected to improve.

Two groups of patients were included in the study. In the first group, 123 patients from the outpatient clinic were each subjected to an intensive study, lasting about 3 hours, including a physical work-up, diagnostic psychiatric interview, psychologic tests, personality inventory and social and cultural classification by an arbitrary standard. These results were statistically analyzed. Sixty-four inpatients in a second group were studied intensively for from 10 to 15 hours each within the framework of dynamically oriented individual and group psychotherapy. From the study and evaluation of these data, the authors were able to show clearly the opeartion of psychosomatic mechanisms in 78 percent of the patients studied, the delayed recovery being the patient's method of avoiding a conflict. The book includes extensive discussion of this avoidance mechanism and includes case material for illustration. The situational, social, and cultural factors are included in the psychosomatic formulation of delayed recovery. The authors used rather active and aggressive short-term psychoanalytically oriented psychotherapy in the rehabilitation of these delayed recoveries. When that method failed, they recommended psychoanalysis.

This study should prove interesting, inspiring, and instructive to the entire medical profession. It should be of particular value to the medical officers of the Armed Forces.

—Lt. Comdr. R. E. Switzer, MC, U. S. N.

Combined Streptomycin-Tuberculin Therapy in Pulmonary Tuberculosis[1]

Methods of Treatment

Eugene C. Jacobs, *Colonel, MC, U. S. A.*

Joseph R. Vivas, *Lieutenant Colonel, MC, U. S. A.*

"No one can enthusiastically and hopefully treat a chronic disease unless he is convinced that the methods used are producing encouraging results." (2)

Believing that the combined streptomycin-tuberculin therapy has already produced encouraging results in the management of pulmonary tuberculosis, we enthusiastically and hopefully present the methods which we have used. The barrier which interferes with the action of streptomycin on the tubercle bacilli within tuberculous lesions (3-6) is primarily the avascularity of these lesions and is caused by thrombosis (7) and endarteritis obliterans of the vessels (8,9) within the lesions and the fibrous encapsulation about them. Efforts have been made to penetrate this barrier by combining other agents with streptomycin, namely: potassium iodide (10), streptokinase (11), and tuberculin (12-14). Maurer (4) has used cavernostomy to drain cavities and to insert a

(1) This work was done at the Walter Reed Army Hospital, Washington, D. C.

(2) Joslin, E. P.: Treatment of diabetes today. J. A. M. A. 140: 581-585, June 18, 1949.

(3) Morin, J.: Streptomycin therapy. Acta tuberc. belg. 40: 48, 1949.

(4) Maurer, G.: Cavernostomy and tamponade of pulmonary cavities with para-aminosalicylic acid. Dis. of Chest 16: 676-683, Dec. 1949.

(5) Shamaskin, A.; Des Autels, E. J.; Sweany, H. C.; and Zvetina, J. R.: Streptomycin in treatment of miliary and meningeal tuberculosis based on study of 30 cases. Dis. of Chest 16: 765-790, Dec. 1949.

(6) Vivas, J. R., and Jacobs, E. C.: Combined streptomycin-tuberculin therapy in pulmonary tuberculosis. Bull. U. S. Army M. Dept. 9: 1-9, Jan. 1949.

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therapeutic agent directly within them. In this article we will consider the use of tuberculin in combination with streptomycin in the treatment of pulmonary tuberculosis.

SELECTION OF PATIENTS

Because accurate data concerning a specific therapy can only be obtained when patients whose diagnosis has been proved bacteriologically are treated, positive smears and cultures are required of all those who are to be treated with combined streptomycin-tuberculin. Although the recovery of the specific micro-organism is presently the only requirement for this treatment, because of certain events in the early history of tuberculin therapy *(15)*, close supervision is recommended in the administration of tuberculin, especially when pulmonary tuberculosis is complicated by extreme toxicity, hemoptysis, or pleural effusion.

It would seem to be superfluous to inject tuberculin into a patient already overwhelmed by the products of the tubercle bacillus, yet several extremely toxic patients in our series have made dramatic recoveries following tuberculin therapy.

It would appear likely that hemoptysis might be increased by tuberculin therapy because tuberculin tends to increase the vascularity about the tubercles and the permeability of the vessels. Although caution is recommended in the use of tuberculin therapy in the presence of hemorrhage, the combined therapy has been used in 3 patients with acute hemorrhage with quick cessation of bleeding in each case. This number is too small to warrant any general conclusions.

It would also seem likely that tuberculin might increase pleural effusion since older phthisiologists have accused it of causing effusion. It was therefore our policy not to administer tuberculin in the presence of pleural effusion, but in treating patients with pulmonary tuberculosis, it was noted that several small effusions disappeared promptly during therapy. One patient with positive sputum and a large pleural effusion was admitted to the hospital. To make reasonably sure that his effusion would not disappear spontaneously, his chest was tapped on several occasions; it quickly refilled with fluid each time. Combined therapy was administered to this patient after a return of the fluid following one of these aspirations. During treatment the effusion disappeared quickly and completely and had not recurred after 1 year of observation. No general conclusions can be drawn from this single case.

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Tuberculous meningitis and miliary tuberculosis are complications which have been treated successfully by the combined therapy. Cavoura *(12)* and Cairns et al. *(13)*, by giving tuberculin intrathecally daily or every second day in conjunction with streptomycin intrathecally and intramuscularly daily, have obtained the most encouraging results yet reported in the treatment of tuberculous meningitis. They have also had success with miliary tuberculosis, both alone and complicated with tuberculous meningitis.

METHOD OF STUDY

After a patient with pulmonary tuberculosis has been accepted for treatment, it is necessary to establish a base line by making certain tests before beginning specific therapy. Also during and following treatment, it is necessary to make further tests in order to determine the patient's progress and prognosis as well as to evaluate the efficacy of the therapy.

Studies prior to therapy:

Tuberculin test (first and second strength).
Roentgenograms of the chest (posteroanterior routinely; lateral, lordotic, oblique, tomograms, stereoscopic, et cetera when indicated).
Streptomycin sensitivity determinations.
Sedimentation rate *(16)*.
Complete blood count.
Urinalysis.
Weight *(16)*.
Photograph of patient with minimum of clothing.
Temperature and pulse *(16)*.
Caloric test (performed by ear, nose, and throat department).
Physical examination.

Studies during therapy:

Daily: Temperature, respiration, and pulse at 0700 and 1900 hours (oftener if indicated).
Weekly: Sedimentation rate, complete blood count, urinalysis, and weight.
Every 10 days: Roentgenogram of chest (posteroanterior) and caloric test.

Studies at completion of therapy (prior to discharge from hospital):

Tuberculin test (first and second strength).
Roentgenogram of chest (posteroanterior; other views if indicated).
Smears and cultures from sputum or gastric washings. (When tubercle bacilli are recovered, streptomycin sensitivity is determined.)

(16) In order to obtain accurate records with a minimal variation due to meals, rest, et cetera, it is highly desirable that this procedure be accomplished at the same hour of the day each time it is performed.

Sedimentation rate.
Complete blood count.
Urinalysis.
Weight.
Photograph of patient with minimum of clothing.
Caloric test.
Physical examination.

Follow-up studies (over a 2-year period):
Roentgenogram of chest once a month.
Smears and cultures from sputum or gastric washings every 4 to 6 months.
Physical examination every 4 to 6 months.

STREPTOMYCIN-TUBERCULIN THERAPY

Commercial full-strength old tuberculin contains 1 gram of tuberculin per cc. and is too potent for clinical use. Coca's buffer solution (table 1) is the diluent recommended. Old tuberculin is decimally diluted by Coca's buffer solution. The first dilution, bottle 1 (1:10), like the full-strength old tuberculin, is very potent and is not used clinically, but it is employed for making the therapeutic dilutions as shown in table 2.

TABLE 1. *Coca's buffer solution**

NaCl		5.0 gm.
$NaHCO_3$		2.7 gm.
Phenol		4.0 gm.
H_2O	q. s.	1,000.0 cc.

*Carbon dioxide is passed through this solution until it remains colorless when phenolphthalein is added. It is then filtered and stored in a refrigerator at 35°-40° F.

After a positive diagnosis has been made, and the base-line studies have been completed, the patient is ready for a course of therapy. Table 3 outlines the dosage of old tuberculin in the initial course of combined streptomycin-tuberculin therapy. This schedule is also used in subsequent courses when the patient is found to be very sensitive to tuberculin (3 or 4 plus in the first strength). One-half gram of streptomycin is given intramuscularly in the buttocks b. i. d. for 42 consecutive days. Old tuberculin, in progressively increasing doses, is given subcutaneously in the arm, forearm, or thigh, using a new site each day.

Local inflammatory reactions usually begin to appear at the site of injection about the twentieth day of the course, but have been seen as early as the sixth. It is undesirable for the reactions to become severe; they should not cause more than moderate pain and swelling; and they should not be permitted to produce vesicles or necrosis. Satisfactory local reactions (mild to moderate) may be produced by varying the

TABLE 2. *Preparation of dilutions of old tuberculin from bottle 1**

Bottle	Mg. of O. T. per cc.	Dilution with buffer solution
2	10.00	$1{:}10^2$
3	1.00	$1{:}10^3$
4	0.10	$1{:}10^4$
5	0.01	$1{:}10^5$
6	0.001	$1{:}10^6$
7	0.0001	$1{:}10^7$
8	0.00001	$1{:}10^8$

*These dilutions of old tuberculin are made in rubber-stoppered bottles by the use of hypodermic syringes, and are stored in a refrigerator at 35°-40° F. The dilutions are made up fresh at least once each month. The tuberculin is then drawn from the bottles as indicated in tables 3 and 4, and injected subcutaneously into the arm, forearm, or thigh, using a new site each day.

schedule slightly when necessary. Severe reactions may be prevented if the physician will examine the local reaction each day prior to prescribing the dose for that day. If reactions become severe in spite of the above precaution, it must be suspected that the injection had been drawn from the wrong bottle, or that the decimal dilutions of tuberculin had not been properly prepared. Table 4 shows the plan of treatment in subsequent courses. This schedule can be used for the first course when a patient is not very sensitive to the tuberculin test. It is modified so as to progress rapidly through the dilute solutions of tuberculin and slowly through the more potent dilutions. It can usually be repeated several times before the emergence of resistance to streptomycin. Patients are allowed a 1-month period of rest between courses when further treatment is indicated. Unless there has been a long interval between courses, it is not always necessary to start at the beginning of the schedule when repeating a course. If a surgical or other form of therapy is contemplated, it should be planned in conjunction with an early course of combined therapy and should not be delayed until it is likely that resistant tubercle bacilli have developed.

In some patients it may be desirable to continue a maintenance injection of tuberculin (just below the maximum dose injected during a course of therapy) once or twice a week for an indefinite period in order to maintain the patient's tolerance to tuberculin. The amount of old tuberculin necessary to complete a course of combined therapy costs but a few cents. Only 2 months of hospitalization are required in order to complete 1 course of therapy. It is also feasible to give the therapy at home with the aid of a trained nurse.

TABLE 3. *Dosage of old tuberculin given subcutaneously in initial course of treatment**

Day of treatment	Old tuberculin	
	Bottle	cc.
1	-	-
2	8	0.2
3	8	0.4
4	8	0.6
5	8	0.8
6	7	0.2
7	7	0.4
8	7	0.6
9	7	0.8
10	6	0.2
11	6	0.4
12	6	0.6
13	6	0.8
14	5	0.2
15	5	0.4
16	5	0.6
17	5	0.8
18	4	0.2
19	4	0.4
20	4	0.6
21	4	0.8
22	3	0.2
23	3	0.4
24	3	0.6
25	3	0.8
26	2	0.2
27	2	0.4
28	2	0.6
29	2	0.8
30 to 42 (inclusive)	-	-

*0.5 gram of streptomycin is given intramuscularly b. i. d. throughout the course. It is important that the nurse place her initials on the schedule after each injection given so that in the event of an error in dosage, it can be quickly discovered and remedied.

TABLE 4. *Dosage of old tuberculin given subcutaneously in courses given after the first**

Day of treatment	Old tuberculin	
	Bottle	cc.
1	8	0.5
2	8	1.0
3	7	0.5
4	7	1.0
5	6	0.3
6	6	0.6
7	6	0.9
8	5	0.2
9	5	0.4
10	5	0.6
11	5	0.8
12	4	0.2
13	4	0.4
14	4	0.6
15	4	0.8
16	3	0.2
17	3	0.4
18	3	0.6
19	3	0.7
20	3	0.8
21	3	0.9
22	2	0.1
23	2	0.2
24	2	0.3
25	2	0.4
26	2	0.5
27	2	0.6
28	2	0.7
29	2	0.8
30	2	0.9
31 to 50 (inclusive)	-	-

*0.5 gram of streptomycin is given intramuscularly b. i. d. from the eighth through the fiftieth day.

MODIFIED BED REST

During the combined therapy, patients having any complications of their pulmonary disease are kept at bed rest. Those without complications who remain in relatively good health, and those in whom complications are well controlled, are allowed to sit in a chair beside their bed early in treatment, and then gradually to be up and about their room as long as they feel no fatigue. At the first indication of mild fatigue they return to bed and rest until they are completely refreshed and again wish to be up. They are permitted to go to the bathroom and to engage in occupational therapy. If they have been at bed rest prior to admission, ambulation must be slow and graduated.

Mild exercise increases metabolism, and in turn respiration, pulse, and blood pressure. There is greater oxygen consumption. More oxygen is carried to the tissues. More blood passes through the infiltrated areas. The perifocal inflammatory reactions are increased. There may be greater absorption of toxin from foci and there may be metastasis of tubercle bacilli. In the presence of therapeutic levels of streptomycin, however, the escape of toxins and bacilli from foci is not undesirable as each reinoculation successfully combated helps the patient to build up his defense *(17)*.

Controlled mild exercise in the phthisic, like that in the normal healthy person, increases the muscular tone, strengthens the heart action, increases the appetite, favors digestion, produces normal tiring, stabilizes the nervous system, and results in normal sleep. In short, it promotes normal physiology and biochemistry and helps a person to combat his disease by increasing his host resistance.

There is a critical period following the termination of the combined therapy when healing of tuberculous lesions by fibrosis is taking place. It is essential that patients be kept in bed during this period with the exception of necessary bathroom privileges. The period lasts from 3 to 6 months depending on the patient's progress and condition. Our patients have spent this period at their respective homes and, with one or two exceptions, have cooperated and responded excellently.

OTHER METHODS OF USING STREPTOMYCIN-TUBERCULIN THERAPY

The methods described above are not the only means of combining tuberculin with streptomycin. Further observation and study may reveal more efficacious ways of combining the two agents, and when a better antibiotic is discovered, it is quite likely that tuberculin will enhance its action.

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Public Information in the Army Medical Service

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A SUBJECT of current interest in the Defense Department and other government agencies is management. Management, like perfection, is made of trifles, yet is no trifle. One of the "trifles" necessary to good management is information. Information, properly handled, is a basic management tool. Industrial or commercial management rests on production, finance, and sales. With slight changes in terminology, these same elements may be applied to management in government: (1) finance in the broad sense corresponds to fiscal planning, budgeting, and allied activities; (2) production to operations; and (3) sales to public acceptance. The success of a business operation depends on the acceptance of a product or service by the public in terms of sales, while the success of a government operation might logically be considered in terms of public acceptance of the agency itself and public satisfaction with the services it receives in return for the tax dollar invested in its activities. Public acceptance or dissatisfaction is measured in terms of increasing or decreasing appropriations.

This management concept is the framework on which an information program can be built. The Army lagged behind in the development of an information program and effective information policies between World War I and World War II. Reduced appropriations, failure of the Army to recover from the negative reaction to things military following World War I, general prosperity followed by a general depression, and mutual lack of understanding between military and civilian groups all contributed to the Army's failure to meet peacetime responsibilities other than those which were purely military. During and since World War II an effort has been made to establish a sound information program and policy.

The 2 basic types of information with which both business and government are concerned are internal and external. When properly coordinated they complement and support each other. One without the other is

(1) Technical Information Office, Office of the Surgeon General, Department of the Army.

always in grave danger of losing its effectiveness. Unfortunately, the Army can gain the knowledge and experience which forms the basis of our military education and acquired skills only from war. A lesson learned, and poignantly demonstrated during World War II, was the fact that nothing was as harmful to the working efficiency and morale of men as speculation and rumor based on misinformation or lack of information concerning policies contemplated or about to be put into effect. Information programs designed to meet these situations can be classified as internal information.

Industry has long considered it good management policy to insure that all employees are aware of the latest developments in their field of interest. Employees who are well informed on current developments within the company are usually satisfied, enthusiastic, and willing to work as part of the team. Uninformed employees, left to guesswork and rumors, are generally dissatisfied, often disillusioned, and usually negative in their approach to their daily work. The purpose of an internal information program is to establish informal liaison between management and the individual employee with the general objective of letting every employee develop within himself a feeling of belonging. Once he feels he belongs, he begins to recognize his own importance as a member of the organization and assumes greater pride in the performance of his duties. He also takes more cognizance of the relation of his job to those of other workers near him.

An internal information program is like a subtle perfume; it pervades the atmosphere of an organization slowly and imperceptibly. The exact moment of awareness of its presence can seldom be measured; it seeps into consciousness gradually and there is a gradual realization on the part of all that there is something pleasant in the atmosphere. Thus, through information a favorable atmosphere of opinion is created within an organization. Under such conditions, work progresses smoothly and efficiently. The attainment of such working conditions is one of the primary objectives of management.

The Information and Education Program within the Army was designed to help commanders reach such objectives. Unfortunately, its success has varied in different areas to the extent to which commanders understood its objectives. There are some who believe the educational feature of this Program has been overemphasized to the detriment of the information program. Even with large areas of misunderstanding concerning the Program, it is generally understood better as an internal information program than public information is understood as an external information program. This is by no means a difficulty limited to those in government agencies. Business men have the same difficulties, but they are usually most willing, at least, to listen to the advice of those who do understand the problems of public relations and public information. Much of the difficulty that creates misunderstanding and distrust in public relations or public information can

be traced to semantics. Such terms as public information, public relations, publicity, propaganda, advertising, and so on have different meanings to different persons. Many of these terms have distasteful connotations to the average person because he has seen charlatans, masquerading as experts, exploiting the gullible and uninformed.

There have been many attempts to define public relations or public information. One of the shortest and simplest definitions describes public relations as "a way of life." Such a description fits because, in the final analysis, most problems in public relations can be reduced to the human relationship factor. As a way of life, public relations applies equally to the individual and to the corporate body. Individuals or corporations who conduct affairs with integrity, intelligence, and forthrightness have the first requisite of a good public relations program. In any task, program or project, public relations starts at the very core of the matter. It is not enough that a business or a government agency conducts its affairs in a straightforward and honest manner; it must also conduct its affairs with intelligence, and intelligence includes proper regard for public opinion. The "public be damned" attitude cannot survive the test of public opinion.

Unfortunately, most people think of public relations as some sort of magic formula by which the public or specialized segments of the public can be beguiled into accepting a given set of circumstances surrounding an action, either anticipated or consummated. Sugar coating the pill is not the job of a public relations officer, nor is it necessary if the action taken is intelligent and reasonable.

All too often the following train of events occurs. A staff officer has a general objective in mind. He discusses his basic plan with his staff and finally arrives at what he considers to be an acceptable plan. At that point coordination with one, two, or possibly more principal staff divisions is indicated. In accordance with sound procedures, the program is then discussed with other interested staff officers. The plan may be accepted as it is, or it may be revised to meet the objections or needs of other operating staff divisions. At that point the staff officer formulates the approved plan. His next step is to put it into operation. At this point someone may say, "We ought to get some publicity on this—better call the PIO." When the PIO (public information officer) arrives he is confronted with a plan which may contain some features that are objectionable from a public relations standpoint.

He then has only 2 alternatives. *First,* he can accept what is given him, wrap the package in pretty paper, tie it with fancy ribbons, and pray that nothing unexpected happens to tear the wrappings. He recognizes that from there on his job is going to be comparable to that of the volunteer fire department or rescue squad. When the wrappings get torn and the package is exposed, he will have to answer the distress signal with frantic patchwork. *Second,* he can voice his opposition to the objectionable portions of the plan. Although this would seem to be the

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best solution, it is very difficult to change a program or plan once it has been approved and is ready to go into operation. Usually, about all the PIO can accomplish by this means is the acquisition of a reputation among the staff divisions concerned as being non-cooperative. Once he has gained such a reputation, he ceases to be of any value to his organization because the success of his mission depends on complete understanding and cooperation on the part of all executives.

To this day, public information officers in the Army are spending a great deal of time putting out fires caused by ill-conceived plans or operations which were launched 6 or 7 years ago. Chickens, as mother always said, come home to roost. As we are all aware, the Medical Service has its share of these problems. The best solution from the Army standpoint is the proper use of the PIO as a staff officer. As such he should be in at the start of the planning and as planning progresses he should be kept informed so that he may consider the possible public reaction to the program as conceived. If a program is logical, intelligent and necessary the PIO can do much to provide public acceptance of the plan with the proper use of information mediums, but even the most logical and well-thought-out program sometimes has "ticklish" aspects to it. These aspects require careful planning on the part of all staff members, including the PIO.

The Army's major problem, in the public relations field, is deciding the point at which public opinion may be disregarded because of the military necessity. Even in these instances proper public-relations planning can reduce public protest to a minimum. Although this is particularly true in wartime, it is also true that the Army must make its greatest effort to inform the public in peacetime. General patriotic fervor and support of the Armed Forces in times of national emergency usually create an atmosphere favorable to the Department of Defense. In wartime people want to be proud of their Armed Forces and tend to condone or accept actions of which they would be less tolerant in peacetime. When the shooting stops, however, bottled-up grievances are freely aired.

The Medical Service has a particularly complicated problem in the public information field in view of the fact that, as a technical service, the support and understanding of small but influential professional groups are required, and that the interests of special groups do not always coincide with those of the general public. Those activities that special groups would sometimes support most strenuously are often, in the public eye, not understood and not supported. Consequently, the welfare of the Army as a whole, for which the Medical Service exists, must be carefully considered in information planning.

In any public-information program the underlying consideration is purpose. A definite purpose should exist, and all elements of the program should be directed toward achieving that purpose. It may be to correct a misunderstanding on the part of the public, or a part of the

public, or it may be to *prevent* such a misunderstanding. Generally speaking, the information program of the Army Medical Service and of the Army as a whole should be directed toward obtaining positive results. Even though we are confident that we are fulfilling our medical mission with the Army, the support of public opinion cannot be expected unless the general public believes we are performing our job adequately.

The only means of demonstrating to the public that we are capable of accomplishing our mission is a sound information program directed toward enhancing the prestige of the Medical Service and attaining public recognition for our accomplishments, past and present. We must also do what we can to increase public understanding of our needs, our objectives, and the necessity for our actions. Once the Medical Service has won the support of the general public, and from those segments of the public on which we depend for our professional personnel and other needs, we will find an improved atmosphere in which we can go about our business. Basic to these objectives is the necessity of conducting our affairs in such a way that public confidence is maintained. That confidence, incidentally, can only be maintained by letting the public know what we are trying to do and what we are accomplishing.

To gain public support we must first take every step possible to remove that fear of the unknown which is normal to everyone. This can only be done by intelligent information planning at all echelons in the Medical Service. Our hospitals must have the community support because they are an integral part of the community in which they are located. Our station hospitals must have not only the support of the military community on the post on which they are located but also must do their share to help their post commanders achieve satisfactory community relations with the areas adjacent to the post. Although intelligent informational planning must be a staff function, all who serve in uniform should help the PIO develop a salable product.

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Cyst of the Pancreas Associated With Diabetes Mellitus

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CYSTS of the pancreas are exceedingly rare and the association of a pancreatic cyst with diabetes mellitus is still more rarely found. The following case is considered worthy of reporting because of its rarity and because it serves to remind us that, although surgical conditions of the pancreas are not always implicated as etiologic factors in patients with diabetes mellitus, nevertheless, we should consider the surgical possibilities in diabetic patients whose symptoms and findings simulate those of the patient reported here.

CASE REPORT

A 34-year-old man was admitted to this hospital for the repair of a recurrent ventral hernia which had followed an abdominal exploratory operation for acute pancreatitis. During the preceding 4 months the patient had complained of gaseous distention, belching, indigestion, and a feeling of fullness in the left upper abdominal quadrant when lying on his left side. He had lost 20 pounds. He had continued to imbibe excessive quantities of alcohol in spite of advice by many doctors to abstain totally. There had been increasing anorexia. His 66-year-old mother was a diabetic. At the time of the ventral hernioplasty the abdomen was not explored. One week following this operation a urinalysis showed the presence of a reducing substance. A blood sugar determination revealed 600 mg. of sugar per 100 cc. The diabetes was readily controlled by diet and insulin. The patient was maintained on 30 units of protamine zinc insulin administered daily before breakfast. In due time he was returned to a limited-duty status.

He was readmitted to the hospital for recurrence of the ventral hernia. Physical examination revealed a fairly large, hard, rounded mass in the left upper abdominal quadrant which was thought to be an enlarged

(1) U. S. Naval Hospital, San Diego, Calif.

spleen or liver. Bone marrow, peripheral blood studies, and needle biopsy of the liver were within normal limits. Roentgenographic studies of the upper gastrointestinal tract with barium demonstrated an extrinsic upper abdominal mass displacing the stomach superiorly and medially (fig. 1).

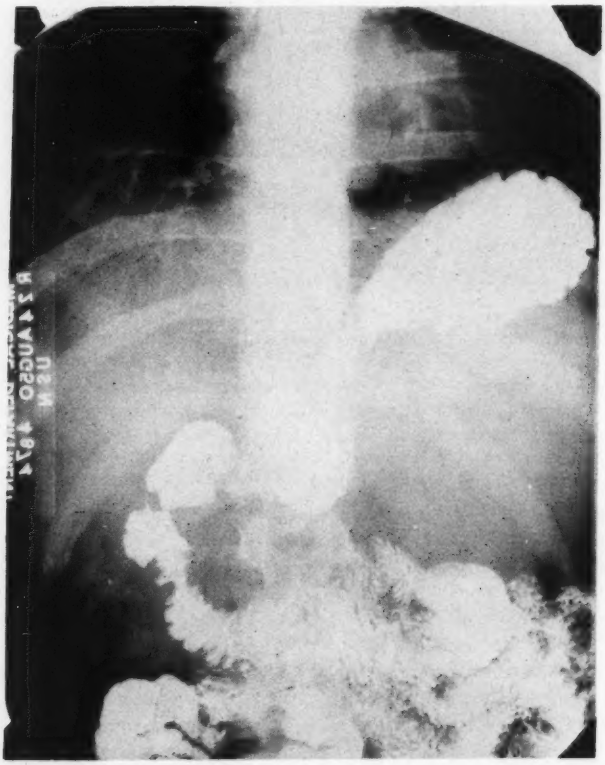


Figure 1. Roentgenogram showing extrinsic compression of the greater curvature of the stomach and displacement of the stomach medially and superiorly.

An exploratory laparotomy was performed on 27 September 1950, at which time a large, thick-walled pancreatic cyst containing about 850 cc. of cloudy, amber fluid was found. The cyst was densely adherent to the posterior gastric wall, descending colon, transverse colon, mesocolon, and spleen. The body and tail of the pancreas were replaced by the cystic mass and only small scattered remnants of pancreatic tissue were noted on the posterior wall of the cyst. At this time macroscopic examination of the liver revealed no evidence of cirrhosis. A biopsy of the liver was contemplated but was deemed unnecessary after direct inspection and palpation of the liver. After much technical difficulty,

caused by the dense fibrous adhesions, the cyst was totally excised. The pancreas was resected to its neck. The duct of Wirsung was identified and the patent lumen was closed. The distal resected portion of Wirsung's duct was found to communicate with the cystic cavity. Because of the dense adhesions to the spleen, this organ was also extirpated. The blood supply to the transverse colon was questionable, and there was a possibility of damage to the middle colic artery, but, in spite of continuous whole blood transfusions throughout the operation, the patient's condition precluded any further operative procedures. A Chaffin-Pratt suction tube was placed down to the sutured end of the pancreas, and the abdomen was closed. Postoperatively, the patient responded satisfactorily with antibiotics and continued whole blood transfusions, having received a total of 5,200 cc. of blood during and immediately after operation.

The pathologist reported a large cystic mass which had been opened and which measured 12 cm. in diameter. The external surface was gray-pink and contained many fibrous tags. The wall was firm, rubbery, and averaged 5 mm. in thickness. The inner surface was flat, slightly roughened, and contained small amounts of adherent, green-brown, puttylike material. Microscopic examination of the wall of the cyst revealed it to consist of dense, hyalinized fibrous tissue containing islands of degenerated pancreatic tissue. There were foci of lymphocytic infiltration throughout the wall with areas of necrosis, recent and old hemorrhage, and calcification. There was no epithelial lining to the cyst and no evidence of malignancy. The pathologist's diagnosis was retention cyst of the pancreas. He stated that in consideration of the surgical findings, the patient's history, and the pathologic inspection of the cyst, it was possible that there had been an epithelial lining at one time which had degenerated and disappeared by long, continued pressure of the fluid within the cyst.

The postoperative course was stormy, but the patient's general condition was bolstered by intermittent whole blood transfusions. The diabetic status was but little influenced by the excision of the pancreatic cyst. Urinary sugar determinations revealed a trace to 3 plus sugar, and fasting blood sugars ranged from 69 to 350 mg. per 100 cc. The patient was maintained on from 10 to 15 units of protamine zinc insulin daily and regular insulin on a sliding scale. A fecal fistula from the transverse colon developed and was subsequently repaired by partial colectomy with an end-to-end anastomosis of the ascending and descending colon. Three weeks following this procedure, a hemorrhage from an eroded vessel of the mesocolon occurred, necessitating further colectomy. A subhepatic abscess eventually developed, resulting in a generalized peritonitis, and the patient died on 17 November.

DISCUSSION

The case records at this hospital were reviewed for the period from 1 January 1946 to 31 December 1950 and in a total of 127,018 admis-

sions for the 5-year period, only 3 cases of pancreatic cyst were uncovered, an incidence of 0.002 percent. Only 1 of these, the one reported here, had an associated diabetes mellitus. Davidson (2) related that only 3 pancreatic cysts were reported by Hale White in 6,708 autopsies. He further stated that in patients with pancreatic cyst the urine rarely shows glucose. Meyer et al. (3) reported that glycosuria was not detected in the routine urinalyses made in their 31 patients with pancreatic cyst. They quoted Warren as stating that, up to 1948, only 16 instances of pancreatic cyst had been encountered in the Lahey Clinic. The incidence of associated glycosuria or diabetes mellitus was not mentioned. Collins (4) found only 9 patients with pancreatic cyst in 209,813 consecutive admissions to the Hollywood Presbyterian Hospital, an incidence of 0.004 percent. He reported on a total excision of a pseudocyst of the pancreas, but diabetes was not found concomitantly nor was any mention made of that finding in the other cases he had reviewed in the literature. Christopher (5), in describing the symptoms of pancreatic cysts, stated that "the early symptoms are vague and may extend over many years, with chronic disease of the gallbladder as the lesion suspected. There may be a sense of fullness or discomfort in the abdomen or actual pain may be experienced. There may be flatulence, indigestion, or vomiting. Pressure may be exerted on the diaphragm, colon, and bile ducts. Jaundice is uncommon, loss of weight is rather frequent; glycosuria and diabetes are sometimes noted. The appearance of a tumor generally directs attention to the true nature of the trouble. It is usually a rounded or oval mass in the epigastrium, mostly in the midline, but sometimes to the left and only rarely moving with respiration. It may descend below the umbilicus, occasionally as far as the pelvis, and fill the abdominal cavity." Most writers agree that pain, usually in the midepigastrium or in the left upper abdominal quadrant, occurs in more than 85 percent of cases, irrespective of the presence or absence of associated disease of surrounding viscera.

Priestley (6) stated that in the laboratory studies of a suspected case, diabetes may be noted owing to the extensive destruction of the pancreatic parenchyma incident to an associated pancreatitis. He listed trauma and pancreatitis as the two most common etiologic factors in the development of pancreatic cysts, and a history of preceding pancreatitis is more frequently given than trauma. Cholecystic disease, gallstones in the ampulla of Vater, mechanical obstruction of the ducts by tumors, parasites, and cicatricial stricture following inflamma-

(2) Davidson, P. B., and Aaron, A. H.: Pancreas. In Piersol, G. M. (editor): Cyclopedia of Medicine, Surgery and Specialties. F. A. Davis Co., Philadelphia, Pa. vol. 11, pp. 109-110.

(3) Meyer, K. A.; Sheridan, A.; and Murphy, R. F.: Pseudocysts of pancreas. Surg., Gynec. & Obst. 88: 219-229, Feb. 1949.

(4) Collins, D. C.: Pseudocysts of pancreas; total excision; report of case. Arch. Surg. 61: 524-539, Sept. 1950.

(5) Christopher, F. (editor): Textbook of Surgery. 2d edition. W. B. Saunders Co., Philadelphia, Pa., 1939. p. 1283.

(6) Priestley, J. T.: Surgical lesions of pancreas. Surg. Clin. N. America 30: 971-986, Aug. 1950.

tory processes are other etiologic factors occasionally uncovered. Diabetes occasionally occurs as a result of acute hemorrhagic pancreatitis but, according to Walters and Clagett (7), there rarely is any evidence of deficiency of pancreatic secretion following pancreatitis. They state that von Schmieden reported 18 cases of diabetes subsequent to pancreatitis, the diabetes being caused by destruction of the islet cells. Small degrees of pancreatitis, together with island changes in the form of slight fibrosis, hyaline deposits, lymphocytic infiltrations, and reduced numbers and irregular forms of islands, may be found by careful search in most cases of diabetes mellitus at autopsy. On the other hand, competent pathologists have found the pancreas to be nearly or completely normal in large numbers of diabetic cases. Walters and Clagett further state that little is known of the cause of pancreatic cysts and experimental studies have added little knowledge. Acute pancreatitis, according to them, has been followed by the formation of cysts, and most of the patients operated on for cysts have shown manifestations of chronic pancreatitis. Most authorities conclude that a previous history of pancreatic or cholecystic disease is elicited by from 60 to 70 percent of the patients with pancreatic cyst.

The surgical management of cysts of the pancreas is still open to debate, but in general, the consensus is that total excision of the cyst, with or without partial pancreatectomy, is the procedure of choice when one encounters small cysts, particularly those which involve the tail of the pancreas. Large cysts usually are so densely adherent to surrounding tissues and organs that marsupialization and drainage are the most judicious methods of treatment employed in the majority of patients.

Brunschwig (8) stated that total pancreatectomy in the diabetic subject does not result in appreciable increase in the severity of the diabetes. In the case reported here, only partial pancreatectomy was performed and the diabetic status was altered very little. The daily maintenance dose of insulin postoperatively decreased to from 10 to 15 units, as compared to a daily preoperative requirement of from 30 to 45 units.

(7) Walters, W., and Clagett, O. T.: Surgery of pancreas. In Piersol, G. M. (editor): Cyclopedia Medicine, Surgery and Specialties. F. A. Davis Co., Philadelphia, Pa. vol. 11, pp. 126-128.

(8) Brunschwig, A.: Pancreatic physiology in light of recent surgical experience. (Editorial) Surg., Gynec. & Obst. 88: 266-267, Feb. 1949.

BOOK REVIEW

The 1951 Year Book of General Surgery (July 1950-May 1951), edited by *Evarts A. Graham,* A. B., M. D., Professor of Surgery, Washington University School of Medicine; Surgeon-in-Chief of the Barnes Hospital and of the Children's Hospital, St. Louis; with a Section on Anesthesia, edited by *Stuart C. Cullen,* M. D., Professor of Surgery and Chairman of Division of Anesthesiology, State University of Iowa College of Medicine and Hospitals. 619 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1951. Price $5.

This book is composed of abstracts of articles selected by the editors from various journals received between July 1950 and May 1951. The opening remark reminds us that all surgeons are human beings, tend to be faddists, fear being thought of as "nonprogressive back numbers," and, as followers, may carry an idea far beyond the concept of its originator.

Part I presents the gist of 391 contemporary professional papers. These abstracts present many valuable advances of practical importance in the technic of various surgical procedures, exclusive of orthopedic and brain surgery; new concepts in establishing and maintaining normal physiologic status in surgical patients; re-evaluation of antibiotics, chemotherapy, and antiseptics in the field of surgery; and a comprehensive and timely coverage of surgery of the lung and thoracic cavity, mediastinum, bony thorax, heart, and major blood vessels. The book should be of value to general practitioners and to the surgeons by virtue of its having separated the wheat from the ever abundant chaff in the current surgical literature.

Part II is concerned with advancements in anesthesiology, subdivided into sections on agents and technics for special situations, various types of analgesia, analgesic drugs, muscle relaxants and the intravenous use of barbiturates, inhalation therapy, and endotracheal technic. It contains much information of interest to the surgeon and to the anesthesiologist. Specially commended for the consideration of each member of a surgical team is the chapter entitled "Physiologic Changes During Anesthesia."

The book is well illustrated and comprehensively indexed.

—*Col. H. Zeliboefer, U. S. A. F. (MC)*

An Outbreak of Q Fever

I. CLINICAL STUDY

Francis X. Fellers, *Captain, U. S. A. F. (MC)*

SINCE the original description of Q fever by Derrick *(1)*, extensive clinical and epidemiologic data have been gathered on this disease. It has been reported from several parts of the world and endemic areas have been described *(2)*. Among the areas of greatest incidence are Italy, Corsica, and Greece. Except for a report of the presence of the causative agent, *Coxiella burnetii,* in ticks in Morocco *(3)* no Q fever has been reported from North Africa.

In February and March 1951, an unusually explosive outbreak of an illness characterized by headache, dry cough, chills, and fever was observed among a group of military personnel stationed in Tripoli, Libya, North Africa. Twenty-five men (one an outpatient) were studied. These 25 patients were selected because the serologic diagnosis of Q fever was positive in the majority, and the remainder presented the typical clinical findings of Q fever. They were servicemen of the Air Force, previously in excellent health, from 18 to 40 years old (most were from 18 to 25 years old). They had all been on duty in Tripoli for at least 4 months, and most for over 6 months, prior to the outbreak. All had received the routine immunizations, including typhus vaccine within the previous year. Twenty-three of these patients lived in one barracks, and the other 2 were from a nearby barracks.

SIGNS AND SYMPTOMS

Of the 24 hospitalized patients, 12 presented themselves to the doctor within the first 3 days of the onset of symptoms. The most common chief complaint was chills and fever. The first symptoms noticed by the

(1) Derrick, E. H.: "Q" fever, a new fever entity: clinical features, diagnosis, and laboratory investigations. M. J. Australia 2: 281-299, Aug. 21, 1937.

(2) Huebner, R. J.; Jellison, W. L.; and Beck, M. D.: Q fever; review of current knowledge. Ann. Int. Med. 30: 495-509, 1949.

(3) Blanc, G.; Martin, L. A.; and Maurice, A.: Sur une rickettsia isolee de tiques dans le sud marocain. Son identité probable avec R. burneti agent de la Q fever. Compt. rend. Acad. d. sc. 223: 438-439, 1946.

patient are shown in table 1. The general symptomatology (table 2) observed agreed with that presented by other authors (4, 5).

TABLE 1. *Initial symptoms in 25 patients with Q fever*

Symptom	*Number of patients*
Headache	12
Malaise	7
Head cold	4
Sore throat	1
Backache	1

TABLE 2. *Symptoms noted by 25 patients with Q fever*

Symptom	*Percent of patients*
Headache	80
Chills and fever	72
Malaise	60
Sore throat	48
Pain or tightness in chest	40
Cough	36
Neurologic	
Stiffness in neck	36
Photophobia	24
Stiffness in back	16
Vomiting	8

On admission these patients showed no physical signs except fever, the average temperature being 100.9° F. All were febrile during the course of the illness and their temperatures varied from 100° to 105° F. The average pulse rate on admission was 95. When the patients were febrile, a relative bradycardia was often observed. Frequently the patients did not appear as ill as the degree of fever would suggest. Inspection of the pharynx generally revealed only minimal injection. Two patients had definite pharyngitis. Transient pulmonary findings were noted in over one half of the patients. These included changes in breath sounds and fine rales. Decreased resonance on percussion was noted in 4 patients. Many of these chest findings were not discovered until inspection of the roentgenogram had shown discrete pulmonary lesions. One patient had a positive Kernig sign bilaterally, and a Babinski reaction of the left foot. Another patient (case 3) showed suggested evidence of meningism. As noted by previous investigators (2), splenomegaly and skin rashes are not consistently seen in patients with Q fever. In the present series, no patient had a rash. One patient had a barely palpable spleen, but there was no change in the size of the spleen during the period of observation. The duration of the illness varied from 2.5 to 16 days (average 8.5) in the untreated group of 11 patients. The remaining patients were given treatment which altered the expected course of the disease.

(4) Denlinger, R. B.: Clinical aspects of Q fever in southern California; study of 80 hospitalized cases. Ann. Int. Med. 30: 510-527, 1949.

(5) Oliphant, J. W.; Gordon, D. A.; Meis, A.; and Parker, R. R.: Q fever in laundry workers. Am. J. Hyg. 49: 76-82, 1949.

LABORATORY EXAMINATIONS

The leukocyte counts varied from 4,400 to 12,500, with from 49 to 82 percent polymorphonuclear cells. The average count on admission was 7,800 with 67 percent polymorphonuclear cells. The total and differential counts did not change significantly in the course of the disease.

Pharyngeal cultures revealed beta-hemolytic streptococci in 40 percent of the original cultures, but with light growth only. No other pathogens were isolated.

A specimen of blood for serologic study was obtained in the first 9 days of the illness; a second specimen was taken in the next 10 to 20 days; a third specimen was taken in the sixth or seventh week; and on some patients, a specimen was taken in the twelfth or thirteenth week. The results of these studies are shown in figures 1 and 2 with the number of individual determinations of the specific agglutination reaction at each observation period plotted against the agglutination titer. The Weil-Felix reaction was performed by the method described by Todd and Sanford *(6)*. Davidsohn's method for heterophile agglutination *(7)* and Young's method for cold agglutinins *(8)* were used. Complement-fixation studies for lymphogranuloma venereum-psittacosis virus and Q fever were carried out at the Army Medical Service Research School, Washington, D. C. Complement-fixation studies for psittacosis were carried out on only 4 patients. An initial specimen of serum was obtained in the first 9 days of the illness and a second specimen in the third week. All tests were negative for psittacosis.

RADIOLOGIC EXAMINATIONS

Radiologic evidence of pneumonitis was present in 20 of the 24 hospitalized patients. Twelve showed involvement of both lungs; 6 of the right lung only; and 2 of the left lung only. This incidence (84 percent) is higher than that usually reported *(2)*. Multiple areas were present in 13 of the patients. The remaining 7 showed only a single area of pneumonitis. These patches were predominantly in the lower two-thirds of the lungs and away from the hilar region. The type of lesion differed greatly, from a single irregular patch of "ground glass" density to several patches of varied size and of markedly increased density. Although there was little correlation between the degree of pneumonitis found and the severity of the disease, an attempt to grade the lesions was made. The roentgenogram of the chest in 12 patients showed 1 or more small lesions less than 2 cm. in diameter; in 6 patients showed areas of pneumonitis about 3 cm. in diameter. Only 2 patients had large areas of increased density, similar to consolidation, measuring more than 5 cm. in diameter. A second roentgenogram was taken about 1 week

(6) Todd, J. C., and Sanford, A. H.: Clinical Diagnosis by Laboratory Methods. 11th edition. W. B. Saunders Co., Philadelphia, Pa., 1948. p. 733.
(7) Footnote reference (6). p. 824.
(8) Footnote reference (6). p. 825.

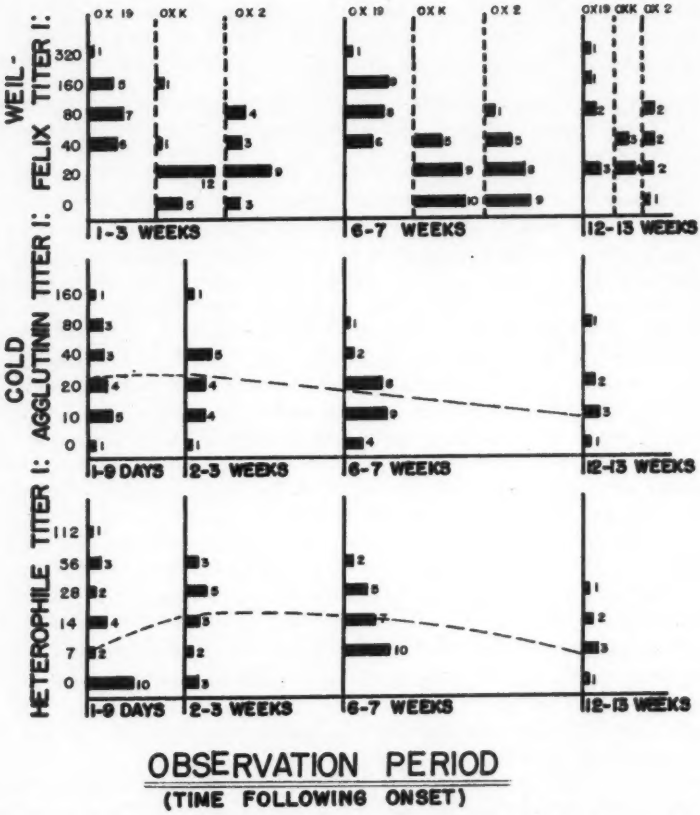


Figure 1. Serologic determinations of Weil-Felix antibodies, cold agglutinins, and heterophile antibodies in patients with Q fever.

after the first and showed improvement in 6; no change in 10; and extension of the process in 2. It is possible that therapy had some effect on these findings. Later roentgenograms showed gradual resolution of the pneumonic lesions.

CASE REPORTS

Case 1. A 21-year-old man, born in Arkansas, was admitted to the hospital on 23 February 1951, the fourth day of his illness. He had first noted headache, followed by generalized aches and pains. When he reported to sick call he was acutely ill. His temperature was 102.2° F.;

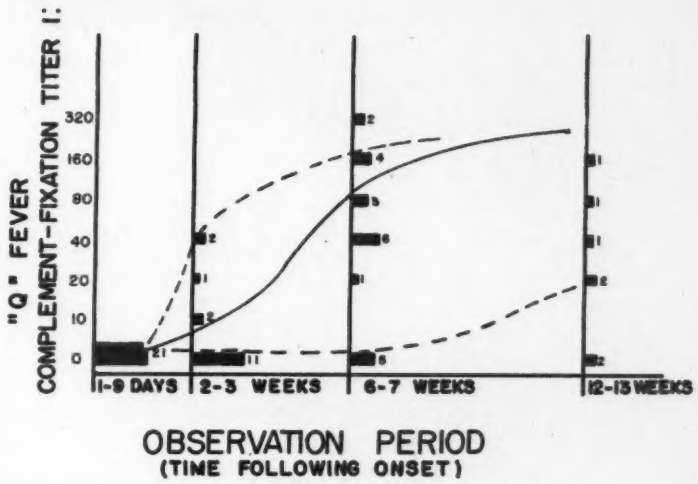
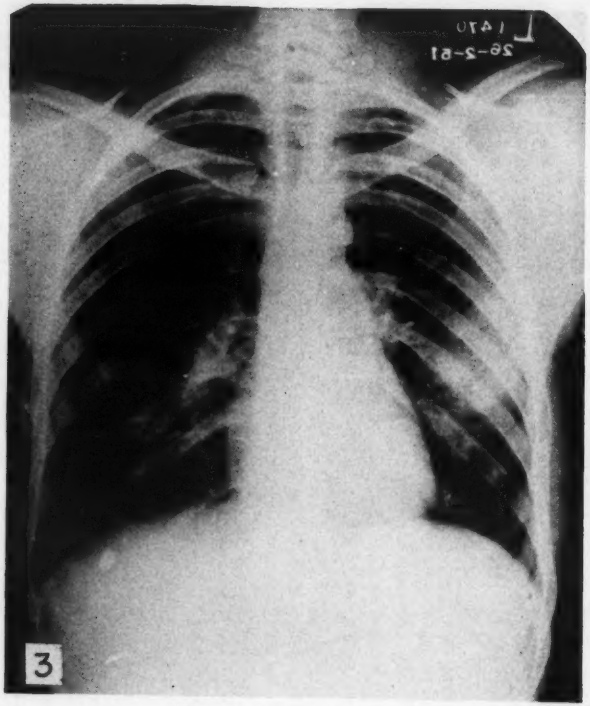


Figure 2. Complement-fixation titer determinations for Q fever during the course of the disease.

his pulse was 96; his respiratory rate was 18 per minute, and his blood pressure was 100/56. His pharynx was mildly injected. His leukocyte count was 12,500 with 77 percent polymorphonuclear cells. A roentgenogram of the chest taken 26 February showed discrete areas of increased density in the left sixth and seventh and in the right seventh, eighth, and ninth interspaces, with increased hilar markings (fig. 3).

Symptomatic treatment only was given. In the first 3 days in the hospital his temperature varied from 100° to 105° F. He had several drenching sweats during this period. Fine rales, which disappeared after 48 hours, were heard in the left axillary area. A roentgenogram of the chest taken on the seventh day of illness showed a definite decrease in the area of pneumonitis. By the ninth day of his illness, the temperature had returned to normal by lysis and the leukocyte count had dropped to 6,500, with 68 percent polymorphonuclear cells. The patient was discharged to duty on 4 March. A complement-fixation test for Q fever was negative 7 days after the onset; 15 days after the onset the titer was 1:40; and 45 days after the onset the titer was 1:160.

Case 2. A 22-year-old man, born in Oklahoma, was admitted to the hospital on 28 February 1951, the eighth day of his illness. For the previous week he had had a persistent cold. On the day prior to admission he noted stiffness in the left side of his neck and had chills and fever. He reported on sick call the following day at which time his temperature was 100° F.; his pulse was 92; his respiratory rate was 20 per minute; and his blood pressure 120/70. His pharynx was slightly



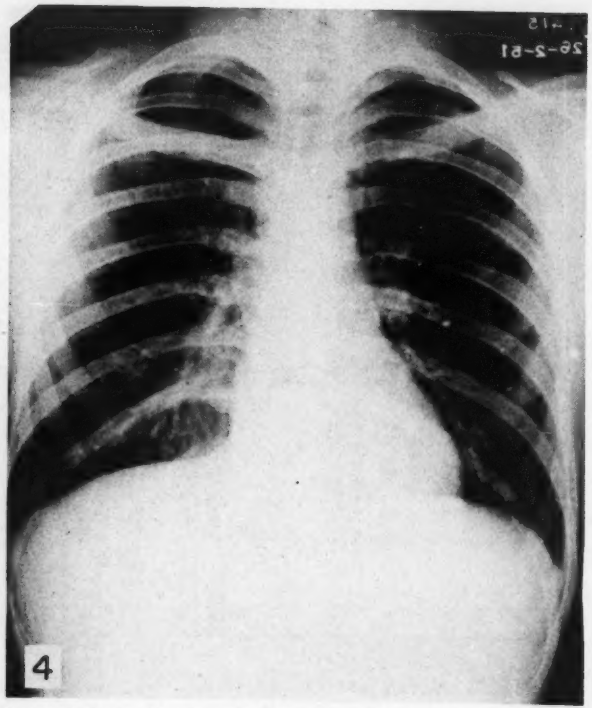


Figure 3 (case 1). Roentgenogram of chest. Figure 4 (case 3). Roentgenogram of chest.

injected and a small cervical lymph node could be palpated on the left side. His leukocyte count was 9,000 with 66 percent polymorphonuclear cells. A roentgenogram of the chest was normal.

His temperature varied from 99° to 103° F. for 5 days, then returned to normal. He had several profuse sweats, but at no time did he feel very sick. He was discharged to duty on 10 March. A complement-fixation test for Q fever was negative 10 days after the onset and 50 days after the onset the titer was 1:320.

Case 3. A 19-year-old man, born in New York, was admitted to the hospital on 26 February 1951, the fifth day of his illness. At the onset he had a persistent headache and for 3 days prior to admission he had general body aching with chills and fever. Just prior to hospitalization he developed a nonproductive cough with some tightness in the chest. On admission he appeared ill, with a temperature of 99.2° F., a pulse of 88, a respiratory rate of 20 per minute, and a blood pressure of 140/70. His pharynx was slightly injected. His leukocyte count was 7,500 with 65 percent polymorphonuclear cells and 1 percent eosinophils. A roentgenogram of the chest taken on admission showed an area of increased density in the right axillary region and increased markings in the base of the right lung (fig. 4).

On the seventh day of his illness, the headache, which he described as throbbing and located over the forehead, became worse. His temperature had remained almost normal. On the following day, he complained of a severe persistent headache and photophobia. Examination revealed some stiffness in the nuchal region and a questionable right Babinski reaction. The eye grounds were normal. During the next week, his neck stiffness and photophobia slowly decreased. His temperature rose to 99.9° F. on the thirteenth day, at which time his leukocyte count was 10,600 with 46 percent polymorphonuclear cells and a second roentgenogram of the chest was normal. The headache was difficult to control. Caffeine with sodium benzoate, calcium gluconate, and codeine were of little avail. Ergotamine tartrate gave temporary relief. By the eighteenth day after onset of his illness, he no longer complained of headache. He was discharged to duty on 13 March. A complement-fixation test for Q fever was negative 6, 10, and 49 days after the onset; and 93 days after the onset the titer was 1:20.

Comment. These patients were representative of the entire group. Case 1 presented the typical symptoms, physical findings, radiologic and laboratory results usually found in Q fever. Case 2 illustrated the course and findings in the 17 percent of the patients in this series who were febrile and had the laboratory findings of Q fever but no pulmonary or radiologic abnormalities. Case 3 showed the symptoms and pulmonary findings in a patient whose course was practically afebrile but who showed some neurologic findings. The diagnosis was confirmed in each

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case by a late rise in the titer for Q fever complement-fixing antibodies. These patients show the variability of form and of the systems implicated in Q fever.

DISCUSSION

An unusual chance to study Q fever was afforded by this outbreak. The incubation period for this disease is from 16 to 18 days, with range of from 13 to 32 days *(2)*.

Denlinger *(4)* noted that several of the patients he reported on had been admitted to a communicable disease unit with a tentative diagnosis of meningitis. Two patients in the present series showed evidence of meningism, one of sufficient degree that a spinal puncture was performed. This patient had been admitted with dizziness, pain in the back and neck, chills and fever, and headache. Kernig and Babinski signs were present on the second day. The spinal fluid examination was completely normal. His symptoms and signs subsided in the subsequent 2 weeks. Case 3 in this series also had meningism, but no spinal tap was performed.

The usual routine serologic and agglutination studies have been reported as normal *(2,4)*. The Weil-Felix agglutination studies were of special interest in this group. Because all of the patients had received routine typhus fever immunizations within the previous year, it was expected that elevated titers of the Proteus antibodies would be found. This was the case, but comparison of the serial determinations of the OX-19, OX-K, and OX-2 antibodies showed no significant titer changes during the periods of observation.

In this series, minor changes only were observed in the heterophile and cold agglutinin reactions during the course of the disease. A heterophile antibody titer of diagnostic significance was noted in one patient but it decreased as the disease progressed. Similarly, elevated cold agglutinin titers noted in two patients decreased to the normal range after the third week of illness. An early rise and later decrease in the nondiagnostic titer range of the heterophile antibodies and cold agglutinins is suggestive of an anamnestic reaction only.

The complement-fixation studies for Q fever were very significant. This group of patients came from 20 states; none were from California *(9)*; 3 were from Pennsylvania *(10)*. The initial serum specimen taken before the tenth day of the illness was negative in all patients except one whose serum was anticomplementary. By the third week of the disease, 5 showed low titers, and by the seventh week of observation, 16 presented elevated complement-fixation titers for Q fever. At the last

(9) Huebner, R. J., and Bell, J. A.: Q fever studies in Southern California; summary of current results and discussion of possible control measures. J. A. M. A. 1951, 145: 301-305, Feb. 3, 1951.

(10) Janton, O. H.; Bondi, A., Jr.; and Sigel, M. M.: Q fever; report of case in Pennsylvania. Ann. Int. Med. 30: 180-184, 1949.

observation, in the twelfth or thirteenth week after the onset of the disease, 4 more presented elevated titers. From this study, it is seen that late in convalescence some of the patients develop immune bodies against Q fever. Two patients with the typical clinical course did not show complement-fixing antibodies for Q fever even at the last observation period. The rather low titers of 1:20 and 1:40 found in some patients in the sixth and twelfth week suggest the possibility that the strain of *C. burnetii* in this area in North Africa is serologically slightly different from that of the antigen used.

SUMMARY

Twenty-five patients with Q fever were observed in Tripoli, North Africa. The clinical course was characterized by an abrupt onset with fever, headache, and an atypical pneumonitis. Four patients showed no abnormal radiologic findings. Two showed meningism. The roentgenograms showed a preponderance of the pulmonary lesions to be located in the lower two-thirds of the lungs and away from the hilar regions. Agglutination studies of routine types showed no diagnostic changes. The complement-fixation studies for Q fever showed a diagnostic rise in titer, usually by the sixth week after the onset. Several patients did not show an elevation in titer until the twelfth week. It is possible that this outbreak was caused by a strain of *C. burnetii* serologically slightly different from that of the antigen used.

BOOK REVIEW

The 1951 Year Book of Obstetrics and Gynecology (August 1950-June 1951), edited by *J. P. Greenhill*, B. S., M. D., F. A. C. S., Professor of Gynecology, Cook County Graduate School of Medicine; Attending Gynecologist, Cook County Hospital; Attending Obstetrician and Gynecologist, Michael Reese Hospital; Associate Staff, Chicago Lying-in Hospital; Author of Office Gynecology, Obstetrics in General Practice, and Principles and Practice of Obstetrics. 567 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1951. Price $5.

This volume maintains the high standard of excellence of previous editions. With the vast amount of literature pertaining to obstetrics and gynecology, and of endocrinology as related to these subjects, the selection of articles shows an erudite mind. Because much of modern gynecologic practice involves a knowledge of endocrinology, it is good to see this phase of the specialty given adequate space. This volume should be a part of the library of anyone who is practicing obstetrics or gynecology either as a general practitioner or a specialist.

—*Commander R. E. Crowder, MC, U. S. N.*

BOOK REVIEWS

Surgical Measures in Hypertension, by *Reginald H. Smithwick,* M. D., Professor of Surgery and Chairman of the Department of Surgery, Boston University, School of Medicine; Surgeon-in-Chief, Massachusetts Memorial Hospital, Boston, Mass. Publication Number 61, American Lecture Series, a monograph in American Lectures in Surgery. 95 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951.

This small monograph contains the essence of Dr. Smithwick's experience in the surgery of hypertension. It is compact, comprehensive and easily readable. To the medical profession as a whole, it is of value as a record of achievement and study; in particular it is an extremely helpful aid for students of surgery whose work will eventually lead them to the treatment of hypertension. The history of hypertension is briefly presented. The selection of patients for operation, the selection of an appropriate surgical procedure, the operative technic, and postoperative problems are discussed in detail.

—*Maj. E. M. Aronstam, MC, U. S. A.*

Diseases of the Nervous System, by *W. Russell Brain,* D. M. (Oxon.), P. R. C. P. (London), Physician to the London Hospital and to the Maida Vale Hospital for Nervous Diseases; Sometime Neurologist to the Infants' Hospital and Physician to the Royal London Ophthalmic Hospital; Theodore Williams Scholar in Physiology in the University of Oxford; Price Scholar in Anatomy and Physiology at the London Hospital. 4th edition. 1,002 pages; illustrated. Oxford University Press, New York, N. Y., publisher, 1951. Price $8.50.

The first edition of this highly practical and valuable text on neurologic diseases appeared in 1933; it was thoroughly revised and rewritten in the third edition which appeared in 1947. The present volume follows an almost identical pattern to the previous edition, with the bibliography giving few references later than 1947. In many sections the text is almost identical. There are, however, new sections on leptospiral meningitis, temporal arteritis, infectious mononucleosis, sarcoidosis, and compression of the median nerve in the carpal tunnel. The sections on asphasia and arterial supply of the brain have been enlarged, and the recent work on the motor cortex, spasticity, sensation, and the frontal lobe receives passing mention. For the medical student and general practitioner this textbook continues to present a worthy, readable, and succinct volume, with a good index. It is not essential, however, to owner's of the third edition.

—*Lt. Commander R. G. Berry, MC, U. S. N.*

Chemical and Biologic Studies on DDT Resistance of Lice[1]

Herbert C. Barnett, *Captain, MSC, U. S. A.*

Edward C. Knoblock, *Major, MSC, U. S. A.*

THE efficacy of DDT in controlling human body lice has been well established both by laboratory studies and by field tests. Bushland et al. (2, 3) found that in 24 hours 10 percent DDT killed 100 percent of the human body lice in beaker tests, in arm-and-leg tests, and in tests on grossly infested persons. They further found that the duration of effectiveness of a 10 percent DDT powder was between 30 and 40 days. Studies in the field (4-9) proved the success of DDT dusts in combating lice and epidemic typhus in many areas of the world. Early in 1951, reports were received from several Army organizations in the Far East Command that DDT dusts were not producing the expected degree of control on human body lice. Concurrently with these reports, numerous samples of 10 percent DDT dust were submitted to this laboratory for chemical assay. A visit by one of us (H. C. B.) to an area where large scale dusting was under way, indicated that the dust was being applied thoroughly and that the rate of application was equal to or in excess of the usually recommended dosage (1½ to 2 oz.

(1) From the 406th Medical General Laboratory.

(2) Bushland, R. C.; McAlister, L. C., Jr.; Eddy, G. W.; and Jones, H. A.: DDT for control of human lice. J. Econ. Ent. 37: 126-127, 1944.

(3) Bushland, R. C.; McAlister, L. C., Jr.; Jones, H. A.; and Culpepper, G. H.: DDT powder for control of lice attacking man. J. Econ. Ent. 38: 210, 1945.

(4) Munro, J. W.: "DDT"; new insecticide. Nature, London 154: 352-353, Sept. 16, 1944.

(5) Soper, F. L.; Davis, W. A.; Markham, F. S.; Richl, L. A.; and Buck, P.: Louse powder studies in North Africa (1943). Arch. Inst. Pasteur d'Algérie 23: 183-223, Sept. 1945.

(6) Ortiz-Mariotte, C.; Malo-Juvera, F.; and Payne, G. C.: Control of typhus fever in Mexican villages and rural populations through use of DDT. Am. J. Pub. Health 35: 1191-1195, Nov. 1945.

(7) Wheeler, C. M.: Control of typhus in Italy 1943-1944 by use of DDT. Am. J. Pub. Health 36: 119-129, Feb. 1946.

(8) Stone, W. S.: Role of DDT in controlling insect-borne diseases of man. J. A. M. A. 132: 507-509, Nov. 2, 1946.

(9) Petrie, P. W. R.: Epidemic typhus in Southwestern Arabia. Am. J. Trop. Med. 29: 501-526, July 1949.

per uniform). It was also found that the degree of louse control was indeed inadequate. As a result of these observations, more intensive chemical and biologic investigations into the problem appeared to be warranted.

TABLE 1. *Chemical assay of DDT samples*

DDT Percentage	Number of samples		
	Old American	New American	New Japanese
Dusting powder			
7.5-8.0	2	-	-
8.1-9.0	7	-	-
9.1-10.0	20	4	2
10.1-11.0	13	5	5
11.1-12.0	3	-	-
12.1-12.8	-	1	-
Total	45	10	7
Technical DDT			
96.0	1	-	-
99.9	1	-	-
100.0	-	3	-
Totals	2	3	0

CHEMICAL STUDIES

Chemical analysis of DDT samples of technical grade and prepared dusting powder was carried out according to the method of the American Association of Official Agricultural Chemists *(10)*. Stocks for evaluation were of 3 categories: (1) old American DDT manufactured during or prior to 1945, (2) new American DDT manufactured in 1951, and (3) new Japanese DDT manufactured in 1951. Some samples of old American DDT examined were from barrels which were rusty and no longer waterproof. In a number of cases, the samples were wet and no longer usable for dusting. Such samples were dried before being assayed. Other samples of old stocks, packaged in individual 2-ounce cans, were generally dry and uniformly powdered even though some of the cans were corroded.

Results of chemical assay of the 3 categories of samples are shown in table 1. The lowest assay was 7.5 percent DDT. This lies well within the range for effective control, as reported by Bushland et al. *(3)*

(10) Lepper, H. A. (chairman, editorial board): Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists. 6th edition. Association of Official Agricultural Chemists, Washington, D. C., 1945. p. 86.

who reported that powders containing as little as 1 percent DDT usually gave complete kill of lice within 24 hours for periods of from 8 to 10 days after application.

Variation in the assay values of the various samples of old American stocks were apparently unrelated to the condition of the samples when collected or delivered to the laboratory. Some samples which required drying from a gummy state assayed higher than some which were in good condition and satisfactory for dusting. By comparison with newer American samples and with Japanese manufactured dusting powders, most of the old American samples were coarser and in many cases were discolored, apparently by rust from the cans and containers.

TABLE 2. *Particle size of DDT dusting powder samples*

Percent of sample passing sieve	Mesh and approximate particle size								
	80 mesh (177 microns)			100 mesh (149 microns)			325 mesh (44 microns)		
	O. A.	N. A.	N. J.	O. A.	N. A.	N. J.	O. A.	N. A.	N. J.
0-40	2	-	-	11	-	-	32	-	-
41-70	9	-	-	9	-	-	4	-	-
71-80	5	-	-	9	-	-	-	2	-
81-90	7	-	-	5	-	-	-	1	1
91-95	10	1	-	2	1	1	-	-	2
96-98	2	-	-	2	1	-	2	2	1
99-100	3	4	5	-	3	4	-	-	1
Total	38	5	5	38	5	5	38	5	5

O. A. = Old American DDT.
N. A. = New American DDT.
N. J. = New Japanese DDT.

The samples were also examined for particle size by screening samples through United States standard mesh sieves. The results are shown in table 2. Specification MIL-I-180A (*11*), for a suitable dusting powder, requires that the insecticide powder contain not less than 9.5 percent or more than 10.5 percent by weight DDT. The finished insecticide powder must be a fine free-flowing material, devoid of lumps, having such fineness that not less than 99 percent shall pass a U. S. Standard No. 80 (177 micron) sieve (dry test). Experiments with the powders of varying fineness did not show any apparent correlation between particle size and percent of lice killed.

BIOLOGIC STUDIES

Procedures. All lice used in these tests were collected from vagrants in Tokyo. To the best of our knowledge, these lice strains had not been

(*11*) Military Specification for Insecticide Powder, Dusting, MIL-I-180A. U. S. Government Printing Office, Washington, D. C., Feb. 7, 1950. p. 2.

previously exposed to DDT, at least not for several months. An initial group of 18 Petri dish tests in which lice were exposed to the insecticide for 24 hours and given no opportunity to feed were conducted. The test apparatus consisted of two disks of cloth treated with DDT and fitted snugly into the bottom of a Petri dish. Ten or 20 lice were placed in each dish and the cover replaced. Only adult and third-instar nymphs were used. DDT was applied by means of a dusting tower modified after Waters *(12)*. The rate of dust application was 13 mg. per square inch (equivalent to 1½ oz. per uniform). Controls consisting of an identical arrangement, except for the substitution of talc for the insecticide, were run with all tests. All test dishes were kept in desiccator jars, inside an incubator, at a constant temperature of 30° C. and at a constant relative humidity of 60 percent. Controls were kept in a second incubator in the same manner.

A second series of 52 tests on DDT samples was conducted using a modified procedure. In this series, gauze-covered pill boxes were substituted for Petri dishes, and lice were given an opportunity to feed by placing the boxes, gauze side down, on a human volunteer twice daily. Twenty adult lice were used in each of these tests. Controls were run concurrently with these tests, with all other procedures being identical to those outlined above.

A third series of tests, consisting of 6 insecticides other than DDT, was conducted using the pill box feeding method. Three tests were run on each compound.

Materials used. Twelve samples of DDT were used in these tests. These could be classified as follows: (1) 5 samples of old American DDT, (2) 4 samples of new American DDT, and (3) 3 samples of new Japanese DDT. The first group of samples was from stocks at least 5 years old. No information was available on the date of manufacture, name of manufacturer, or procurement source. Four samples were taken from large drums and the fifth was taken from 2-ounce cans. The second group of samples was obtained from stocks of newly manufactured DDT from 4 American manufacturers. The third group consisted of samples of newly manufactured stocks from 3 Japanese manufacturers. None of the samples in the latter 2 groups were over 3 months old. All samples were ostensibly 10 percent DDT dusts. Assay data, particle size data, and diluent for the samples used are given in table 3. All DDT assays and sieve tests were performed by the Department of Chemistry of this laboratory.

Results. The first series of 18 tests was conducted over a 24-hour period without feeding the lice. Three samples of old American DDT were used. The mortality results obtained in these tests are given in

(12) Waters, H. A.: General methods and equipment. In Campbell, F. L., and Moulton, F. R. (editors): Laboratory Procedures in Studies of Chemical Control of Insects. American Association for the Advancement of Science, Washington, D. C., 1943. pp. 115-123.

TABLE 3. *Characteristics of DDT samples tested*

Sample number	DDT assay (percent)	Percent of sample passing through 80 mesh sieve	Diluent
Old American			
1	11.4	70	Talc
2	9.4	80	Talc
3	8.5	88	Talc
4	11.1	84	Talc
5	10.0	99	Pyrophyllite
New American			
1	12.8	100	Talc
2	10.9	100	Talc
3	9.4	100	Pyrophyllite
4	9.3	100	Pyrophyllite
New Japanese			
1	9.7	100	Talc
2	10.1	100	Talc
3	9.8	100	Talc

table 4. It will be noted that none of the materials tested produced over 60 percent mortality, and that all controls also exhibited high mortalities.

A second series of 52 tests in which all DDT samples were tested is summarized in table 5. In this series, lice were held for 48 hours and given the opportunity to feed on a human subject twice daily. Samples of American DDT produced the greatest mortality. The difference between mortalities of treated lice and their controls was greatest for the newly manufactured American DDT. The results obtained in all these tests show significantly lower mortalities than those reported in laboratory tests with American strains of lice (2, 3).

Bushland et al. (3) reported that after lice had been exposed to 10 percent DDT powder for 3½ hours, no lice were capable of feeding, although only 60 percent of them had been "knocked down" by the

TABLE 4. *Results of 24-hour exposure of lice to 5-year-old DDT*

Sample number	Number of tests	Mortality in treated group		Mortality in controls	
		Number	Percent	Number	Percent
3	3	15/30	50	6/30	20
4	6	36/60	60	6/30	20
5	9	58/130	45	27/110	25
Total	18	109/220	50	39/170	23

TABLE 5. *Results of exposure of lice to DDT for 48 hours*

DDT	Number of tests	24-hour mortality				48-hour mortality			
		Treated lice		Controls		Treated lice		Controls	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Old American	20	228/400	57	86/360	24	297/400	74	164/360	46
New American	20	220/400	55	63/357	18	298/400	75	118/357	33
New Japanese	12	83/240	35	40/240	17	113/240	47	70/240	29
Total	52	531/1040	51	189/957	20	708/1040	68	352/957	37

insecticide at this time. They point out that the interference in feeding habits is significant because it would effectively prevent transmission of typhus, pending the lethal action of the insecticide. Observations on the Tokyo strains of lice indicate that DDT is ineffective in interfering with the feeding habits of these lice. Table 6 shows the observations made on the feeding habits of lice surviving exposure to DDT. Particle size of DDT dusts showed no correlation with mortality in lice and did not exhibit any effect on the feeding habits of exposed lice.

TABLE 6. *Effects of DDT exposure on feeding habits of lice*

DDT	6-hour exposure			32-hour exposure		
	Number surviving	Number feeding	Percent feeding	Number surviving	Number feeding	Percent feeding
Old American	369	312	85	172	135	78
New American	306	281	92	180	126	70
New Japanese	211	204	97	157	144	92
Total	886	797	90	509	405	80

A series of 18 tests was performed on lice, using 6 insecticidal preparations other than DDT. These were (1) 5 percent benzene hexachloride (1.5 percent gamma isomer) in talc; (2) a mixture of 0.2 percent pyrethrins, 2 percent piperonyl butoxide and 0.25 percent phenol S in talc; (3) 0.22 percent pyrethrins in talc; (4) a mixture of 0.15 percent pyrethrins and 0.15 percent N-octyl bicycloheptene dicarboximid in talc; (5) 0.46 percent allethrin in talc; and (6) a mixture of 0.2 percent allethrin, and 0.2 percent N-octyl bicycloheptene dicarboximid in talc, respectively. Three tests were run on each compound. Technics used were identical with those used in the pill box feeding series for DDT. The results obtained with these compounds are given in table 7. All compounds produced higher mortalities than DDT and several gave complete kill within 24 hours.

TABLE 7. *Results of insecticide tests on human body lice*

Compound	24-hour mortality				48-hour mortality			
	Treated lice		Controls		Treated lice		Controls	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	60/60	100	11/40	28	60/60	100	12/40	30
2	60/60	100	11/40	28	60/60	100	12/40	30
3	60/60	100	1/40	3	60/60	100	7/40	18
4	56/60	93	1/40	3	60/60	100	7/40	18
5	53/60	88	1/40	3	60/60	100	7/40	18
6	40/60	67	1/40	3	50/60	83	7/40	18

DISCUSSION

The data presented herein establish that strains of human body lice, obtained from vagrants in Tokyo, are not completely controlled by DDT. Chemical analysis has indicated that several of the samples of DDT used in these tests were well within the specifications set for this insecticide. This study also establishes that these lice are highly susceptible to other insecticides. It must, therefore, be concluded that the strains of lice used in this work show a distinct resistance to DDT. Whether or not this resistance is natural or acquired cannot presently be demonstrated, but it is believed that the lice used have not been previously exposed to DDT, at least not for several months.

SUMMARY

Evidence is presented to indicate that human body lice in Tokyo bear a distinct resistance to DDT. It is further indicated that this resistance manifests itself not only by limited mortality but also by the ability of surviving lice to feed readily. Tests with insecticides other than DDT gave much better kills.

BOOK REVIEW

Human Biochemistry, by *Israel S. Kleiner*, Ph. D., Professor of Biochemistry and Director of the Department of Biochemistry, New York Medical College, Flower and Fifth Avenue Hospitals; Formerly Associate, The Rockefeller Institute for Medical Research, New York. 695 pages; 83 illustrations; 5 color plates. 3d edition. The C. V. Mosby Co., St. Louis, Mo., Publishers, 1951. Price $7.

This new edition of a well-known textbook has incorporated within it all of the important advances in biochemical research made in the past 3 years. This book has become a standard reference work for students and clinicians. Its style is clear and concise. The new edition, like the earlier ones, stresses the clinical aspects of biochemistry without neglecting the fundamentals. The greatest revision is found in the chapters on mineral metabolism and water balance, respiration and acid base balance, blood coagulation, and vitamin A. The chapters on enzymes, vitamins, hormones and metabolism have been expanded. There is an excellent chart on the composition of foods and edible materials in the appendix. This book is recommended to all students and physicians who wish to understand the fundamental aspects of biochemistry as they are related to the clinical practice of medicine.—*Lt. Col. T. A. Haedicke, MC. U. S. A.*

Neuropathy Caused by Intramuscular Injection

David J. LaFia, *First Lieutenant, MC, U. S. A. (1)*

INTRAMUSCULAR injection of drugs is commonplace. Countless injections are given daily with little thought to potential untoward reactions. Considering this widespread practice the dearth of reported cases of neuropathy is surprising. Peripheral neuropathy following intramuscular injection results from: (1) direct injury to nerve fibers or nerve sheaths; or (2) a nonspecific, harmful reaction of nerves to such substances as lead, arsenicals, and antirabic or antidiphtheritic inoculations. The mechanism remains unknown, although Latimer *(2)* and others *(3)* attribute the neuropathy to an allergic reaction. Besides peripheral neuropathy radiculitis, meningoradiculitis, meningomyelitis, or encephalitis may occur. In this article 2 cases illustrating the 2 types of nerve injury are reported.

CASE REPORTS

Case 1. A 27-year-old man entered this hospital on 19 January 1951 complaining of weakness in the left shoulder, limited extension of the left elbow, pain in the left cubital region, and wasting of the left biceps muscle His disability began on 11 October 1950 several hours after inoculation in the left deltoid region with triple typhoid vaccine and tetanus toxoid. He said, "My left arm down to my fingers swelled and beat with pain." His entire left arm became edematous. The inner aspect of his left arm became acutely tender. Ten days later the arm had returned to normal size, but the patient was unable to raise it, or to extend the elbow. He complained of a persistent gnawing pain in the left cubital region. One week later he regained almost complete movement in the left elbow, although he still could not extend it completely. Because of continual pain and weakness in his left shoulder and elbow he was unable to perform full duty.

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(1) At Madigan Army Hospital, Tacoma, Wash., at time of writing this article; now at U. S. Army Hospital, Camp Gordon, Ga.

(2) Latimer, F. R., et al.: Neurological complications of rabies vaccine; report of two cases. Arch. Neurol. & Psychiat. 65: 16-29, Jan. 1951.

(3) Grinker, R. R.: Neurology. 3d edition. Charles C Thomas, Publisher, Springfield, Ill., 1943. pp. 207-214 and pp. 788-792.

Figure 1 (case 1). Note the atrophy of the left biceps and deltoid muscles. Figure 2 (case 1). Note the atrophy of the long head of the left triceps and the posterior fibers of the left deltoid.

Physical examination revealed: (1) moderate atrophy of the biceps, deltoid, and long head of the triceps on the left (figs. 1 and 2); (2) a slight weakness of left deltoid and triceps muscles; (3) extension of left elbow limited to 150°; (4) supination of left forearm limited to 50° from neutral position; (5) no sensory impairment; (6) tenderness over left cubital region; and (7) enlarged and nontender lymph nodes in left axilla. A diagnosis of a nonspecific serum reaction causing neuropathy of the left axillary, radial, and musculocutaneous nerves was made. To rule out radiculitis and arachnoiditis of the cervical spinal cord, a lumbar puncture was performed. The spinal fluid findings were normal. The jugular compression test indicated absence of a subarachnoid block. Roentgenograms of the left shoulder, elbow, and cervical spine were normal.

Pain in the left cubital region was not completely alleviated by analgesics. Left stellate ganglion blocks were performed to give relief, but these were ineffective. Diathermy and massage were used several times weekly for 2 months. The pain gradually diminished and almost disappeared and movement in the left elbow improved. The atrophied muscles remained unchanged. The only significant residual was limitation of supination of the left forearm. This was apparently due to contracture of the left biceps tendon. The patient was returned to duty on 30 April 1951.

Case 2. A 24-year-old man entered this hospital on 4 January 1951 complaining of weakness of the left foot and leg, atrophy of the left leg, and occasional pain along the left sciatic nerve. His disability began in May 1950 after an injection of penicillin in the left buttock for gonorrhea. He said, "When they stuck the needle in my left hip I felt electricity run down the back of my left leg going to my toes. My toes then jumped." Following the injection his left leg had become weak and intermittently painful. He continued to perform full duty but by January 1951 his left leg had become noticeably smaller than the right and was so weak he could not work.

Figure 3 (case 2). Note the atrophy of the left calf muscles.

Physical examination revealed: (1) atrophy of the left calf muscles (fig. 3); (2) 50 percent impairment of normal plantarflexion of the left foot; (3) barely perceptible dorsiflexion of the left foot; (4) impaired sensation over the lateral aspects of the left leg and foot; (5) hypoactive left ankle jerk; and (6) no fascicular twitchings of left leg.

From the clinical findings a diagnosis of direct injury to the left sciatic nerve was made. The patient was transferred to a peripheral nerve center.

COMMENT

Case 1 illustrates neuropathy occurring as a reaction following tetanus toxoid and typhoid vaccine and case 2 illustrates direct injury to a nerve. Because there is no known cure for neuropathy, emphasis must be placed on prevention. The following rules should be observed in giving intramuscular injections: (1) never use a needle longer than 3.5 cm.; (2) in injecting the gluteal region use only the upper outer quadrant and point the needle laterally; and (3) in injecting the deltoid region point the needle anteriorly and never inject lower than 5 cm. from the acromial process. In case 1, the patient was first seen for edema of the arm, and it is suggested that the use of an antihistaminic drug might have lessened the intensity of the neuropathy.

BOOK REVIEW

Cost of Medical Care, The Expenditures for Medical Care of 455 Families in the San Francisco Bay Area, 1947-1948, by *Emily H. Huntington.* 146 pages. University of California Press, Berkeley and Los Angeles, Calif., publishers, 1951. Price $2.50.

This interesting study of the cost of medical care in 455 families in the San Francisco Bay area in 1947-1948 provides a host of social, economic, and medical facts and figures. The comparison with previous studies well shows the sharp increase in medical costs. Only direct medical costs are included; the indirect expenses arising from a major illness may be equal or greater than direct, and data in this area is entirely lacking. The tabulations of disease by incidence and disease by cost are excellent and well indicate how the families' medical dollar is spent. The conclusions may be subject to argument, but the data is a valuable contribution to the problem, and the facts and figures presented give an excellent picture of the cost of medical care.

—*Lt. Col. L. C. Kossuth, U. S. A. F. (MC)*

Persistent Trismus During Ether Anesthesia

William W. Montgomery, *Lieutenant, junior grade, MC, U. S. N. R.* (1)

TRISMUS may be defined as a tonic spasm of the muscles of mastication in the absence of temporomandibular joint pathology. I have found no report of persistent trismus during ether anesthesia in the literature. Clonic spasm of the masticatory muscles is frequently seen in ether anesthesia. Papper (2) mentions clonic and tonic phases of masticatory spasms occurring as a part of general muscular twitchings during ether anesthesia. An unusually persistent case is reported.

CASE REPORT

A 4-year-old boy was admitted to this hospital on 24 January 1951 for tonsillectomy and adenoidectomy. He had had repeated episodes of tonsillitis in the previous 2 years, acute catarrhal otitis media 3 months previously, and uncomplicated measles and mumps. He had been a mouth breather since infancy, had foul breath frequently, and had stertorous breathing while sleeping. On physical examination a wide nasal bridge, partial bilateral nasal obstruction, enlarged cryptic tonsils, excessive adenoid tissue and a few small, firm, nontender, lymph nodes in both cervical triangles were found.

On 25 January the child was taken to the operating room, 1 hour after receiving 25 mg. of demerol intramuscularly. Anesthesia was rapidly induced with fresh vinyl ether and he was carried to the first plane of the third stage of anesthesia. At this time, while the surgeon was attempting to insert a mouth gag, severe trismus was noted. The teeth were in tight opposition and the masticatory muscles were palpably boardlike. Attempts to insert the mouth gag and to proceed with the operation were abandoned after 45 minutes of deep ether anesthesia because of persisting spasm of the masticatory muscles. All other muscles of the child's body were entirely relaxed, trismus being the only abnormality to the deep ether anesthesia.

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(1) U. S. Naval Hospital, Portsmouth, N. H.

(2) Papper, E. M.: Convulsions during inhalation anesthesia. Bull. U. S. Army M. Dept. (No. 84). pp. 81-85, Jan. 1945.

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On the following day roentgenograms of the temporomandibular joints, the chest, and the cervical spine and various blood studies showed no abnormalities. On January 28, the patient was again anesthetized after receiving the same dosage of demerol. Induction was again accomplished with vinyl ether and he was carried to the late second plane of third stage ether anesthesia. Again trismus was encountered and persisted after 30 minutes of deep anesthesia. At this point the surgeon injected 3 cc. of 2 percent procaine hydrochloride solution into each masseter muscle. Complete relaxation of the jaw occurred in about 30 seconds after these injections. Tonsillectomy and adenoidectomy were then performed without complications. Normal jaw function was noted immediately on recovery from anesthesia. The postoperative course was uneventful and the patient was discharged from the hospital on the fourth postoperative day.

COMMENT

Trismus may be classified as being central, peripheral, or hysterical in origin. Trismus of *central* origin is the result of a cortical irritation of the trigeminal nerve. Among the causes of this type of irritation are lesions in that part of the cerebral cortex which control the muscles of mastication. Trismus of central origin may also be an early manifestation of widespread irritation of the central nervous system (3). This is brought about by hyperventilation (4), anoxia (5), strychnine poisoning, and such diseases as tetanus and rabies.

Trismus of *peripheral* origin is caused by : (1) reflex irritation of the motor portion of the trigeminal nerve arising from lesions in the jaw, mouth (3), or nasopharynx, (6,7); (2) increased reflex excitability of the motor trigeminal nerve (8); and (3) irritation of the masticatory muscles due to infection, or fracture in the region of their insertions. *Hysterical* trismus occurs in the absence of central lesions, cranial nerve disturbances, or local masticatory muscle irritation. Hysteria may have caused the trismus in this child because he had an abnormal fear of the hospital and insisted that his tonsils were not to be removed. This was especially evident prior to the induction of general anesthesia. Trismus in this patient differed from the usual hysterical type in which relaxation of the muscle spasm under light general anesthesia is a pathognomonic finding.

(3) Riley, H. A.: Trigeminal nerve. In Cecil, R. L.: Textbook of Medicine. 7th edition. W. B. Saunders Co., Philadelphia, Pa., 1947. pp. 1609-1612.

(4) Dodd, K.: Hypocalcemic states; special reviews. Pediatrics 21: 737-743, Dec. 1948.

(5) Galley, A. H.: Anesthetic Emergencies. In Evans, F. T.: Modern Practice in Anaesthesia. Butterworth & Co., Ltd., London. 1949. p. 357.

(6) Rosenow, E. C., and Tovell, R. M.: Etiology of muscular spasms during general anesthesia. Am. J. Surg. 34: 474-485, Dec. 1936.

(7) Rosenow, E. C.; Mousel, L. H.; and Lundy, J. S.: Further studies on muscular spasms during general anesthesia. Experimental results with neurotropic streptococci from nasopharynges of patients. Anesthesiology 6: 12-31, Jan. 1945.

(8) Poulsen, T., and Secher, O.: Experimental investigation into peripheral action of ether and its influence on reflex excitability. Acta. pharmacol. et toxicol. 5: 196-212, 1949.

The Treatment of Congenital Megacolon

Elmore M. Aronstam, *Major, MC, U. S. A.* (1)

SINCE the initial report of Hirschsprung (2), congenital megacolon has become a recognized clinical entity. Although this condition is commonly reported in children, few cases are reported in adults (3,4) principally because most cases are discovered in childhood and because in the untreated and in the medically managed patients, the mortality is quite high. Grimson et al. (5) estimated from 19 to 79 percent mortality in patients treated medically with an average of 58 percent in those with severe forms of the disease.

The criteria of diagnosis for congenital megacolon are (1) a history of constipation, generally of severe degree, from the time of birth and (2) evidence of marked hypertrophy and dilatation of the colon. In addition, borborygmi and visible peristalsis may be noted. The course of the illness may be complicated by nutritive deficiency, acute intestinal obstruction, colitis and colonic perforation. A familial incidence (6) has been noted.

The site of the megacolon (7,8) is usually the sigmoid and descending colon. Occasionally, the upper part of the rectum or the entire rectum

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(1) Rodriguez Army Hospital, Puerto Rico.

(2) Hirschsprung: Stuhltragheit Neugeborenen im Folge von Dilitation und Hypertrophie des Colons. Jahrb. F. Kinderh. 27: 1-7, 1888.

(3) Rosin, J. D.; Eatgen, J. A.; and Waugh, J. M.: Congenital megacolon of man 54 years of age; report of case. Proc. Staff Meet. Mayo Clin. 25: 710-715, Dec. 20, 1950.

(4) Creech, B.: Megacolon; review of literature and report of case in aged. North Carolina M. J. 11: 241-246, May 1950.

(5) Grimson, K. S.; Vandegrift, H. N.; and Dratz, H. M.: Management and prognosis of megacolon (Hirschsprung's disease); review of 24 cases. Am. J. Dis. Child. 68: 102-115, Aug. 1944.

(6) Bodian, M.; Carter, C. O.; and Ward, B. C. H.: Hirschsprung's disease. Lancet 1: 302-309, Feb. 10, 1951.

(7) Hiatt, R. B.: Pathological physiology of congenital megacolon. Ann. Surg. 133: 313-320, Mar. 1951.

(8) Hiatt, R. B.: Surgical treatment of congenital megacolon. Ann. Surg. 133: 321-329, Mar. 1951.

is involved. Cases have been reported involving even the ascending colon (6). Dalle Valle (9) was the first to describe absence of the myenteric plexus of Auerbach in the segments just distal to the dilated colon. The mechanism of production of the megacolon has been summarized by Swenson et al. (10) and Hiatt (7) who, by balloon kymographic studies, demonstrated normal peristaltic activity in the dilated colon down to the narrow sigmoid or rectum where absence of the myenteric plexus was demonstrated. It is believed that the peristaltic waves do not pass these areas because of the absence of nervous elements.

Modern treatment (7,8,10-13) resolves itself into resection of the denervated segment distally and a portion or all of the dilated colon above which the colon may be ulcerated as a result of stasis and infection. In infants, operation is usually postponed until 6 or 8 months after birth when the extent of the colonic dilatation is clearly delineated. Generally a primary anastomosis in one stage is performed. Swenson (11) recommended an operation in which the attachments of the dilated colon and all parts of the bowel distal to it are freed through an abdominal incision. The bowel is then artificially prolapsed and the dilated colon amputated just above the sphincter ani. The free end is anastomosed to the mucosal stump at the site of the amputation. He has reported 34 cases with one postoperative death. Hiatt (8) has described a similar procedure. The presacral space is drained regularly. These infants are maintained for a while on tidal drainage (11). Usually there is a mild diarrhea during the first few postoperative weeks but eventually the patient has 1 or 2 bowel movements a day. Resection of only the dilated segment of the colon has been practiced (14) but this method is little used in this country.

CASE REPORT

A 55-year-old man was admitted to this hospital on 16 July 1951 complaining of abdominal pain and distention of 2-day duration. He had had chronic constipation since birth. As long as he could remember, his bowels moved only once every 10 to 14 days. In October 1944, he had entered a hospital for an episode of "intestinal obstruction." A report

(9) Dalle Valle, A.: Ricerche istologiche su di im caso di megacolon congenito. Pediatria 28: 740-752, Aug. 15, 1920.

(10) Swenson, O.; Rheinlander, H. F.; and Diamond, I.: Hirschsprung's disease: new concept of etiology; operative results in 34 patients. New England J. Med. 241: 551-556, Oct. 13, 1949.

(11) Swenson, O.: New surgical treatment for Hirschsprung's disease. Surgery 28: 371-383, Aug. 1950.

(12) Lee, C. M., Jr.; Bebb, K. C.; and Brown, J. R.: Selective management of megacolon in infants and children. Surg., Gynec. & Obst. 91: 281-295, July 1950.

(13) Dixon, C. F., and Judd, D. B.: Symposium on surgical physiology; surgical treatment of congenital megacolon. S. Clin. North America 28: 889-901, Aug. 1948.

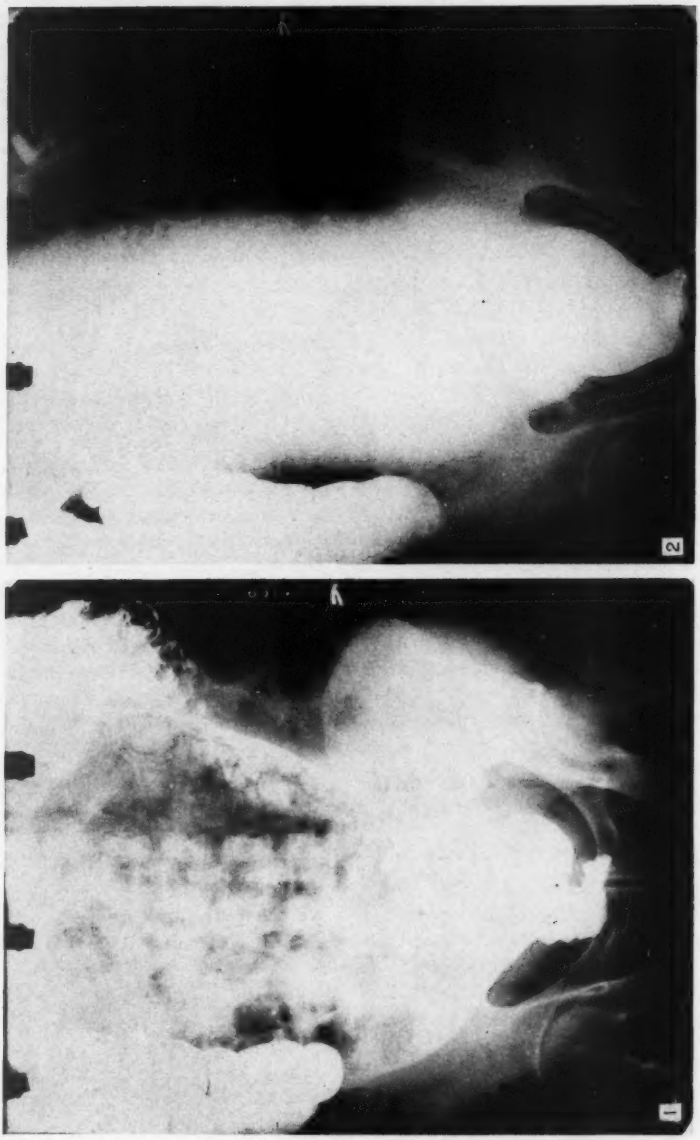
(14) Ritter, J. A.; Hawthorne, H. R.; and Metzger, H. N.: Congenital megacolon; report of 3 cases of "obstructive" type treated by resection of dilated segment in contrast to resection of distal narrowed segment. Pediatrics 5: 791-798, May 5, 1950.

from that hospital revealed that this patient had been diagnosed as having a megacolon and an appendicostomy had been performed through the right rectus abdominis muscle. This procedure apparently relieved his distention in the following 2 years but no change in his bowel habits was noted and the appendicostomy had gradually closed. He stated that he had had no bowel movement for 22 days prior to admission. For the preceding 48 hours he had become greatly distended and had had low abdominal cramps which were associated with nausea, vomiting, fever, and malaise. Twenty-four hours prior to admission, he was taken to the hospital where he had been operated on and two enemas were given. This gave him some relief but because of recurrence of his distress, he was transferred to this hospital. There was no familial history of megacolon.

On admission the patient appeared to be acutely ill. His temperature was 101.8° F. His abdomen was greatly distended and slightly tender in all quadrants. No peristaltic sounds were heard. There was an incisional hernia through the lower portion of the right rectus abdominis muscle. A small fistulous tract discharged through this hernia. Rectal examination was negative.

On admission the patient's leukocyte count was 20,000. His serum protein level was 5.1 grams per 100 cc. A roentgenogram of the chest revealed a marked elevation of the diaphragm, particularly on the left side. Roentgenograms of the abdomen showed a large quantity of gas and feces in the intestines but no evidence of intestinal obstruction. An emergency barium enema (figs. 1 and 2) disclosed great dilatation of the descending colon which occupied almost the entire abdomen and displaced the ascending colon upward and to the left. There was an irregularity of the walls of the rectum with marked narrowing of the rectal ampulla. Sigmoidoscopy revealed moderate inflammation and edema of the sigmoid.

It was clear at this time that the patient's symptoms were due to a megacolon with secondary colitis and retention of fecal material. For the first several days, he was given nothing by mouth and fed intravenously. He received penicillin and streptomycin parenterally for his inflammatory lesion. A rectal tube was inserted and frequent rectal instillations of mineral oil were given which were later siphoned off. These measures were continued for several days and the leukocyte count dropped gradually to nearly normal. On the day following admission a large Foley catheter was inserted into the cecum through the appendicostomy opening and several irrigations with normal saline solution were given daily. Free drainage from the catheter was permitted between the instillations. On 21 July, small colonic irrigations with normal saline solution were started. Because the patient's afternoon temperatures reached 101° F. daily, treatment with aureomycin by mouth was started on 23 July. About this time he was placed on a soft diet with supplemental vitamin K and mineral oil by mouth. Siphonage from



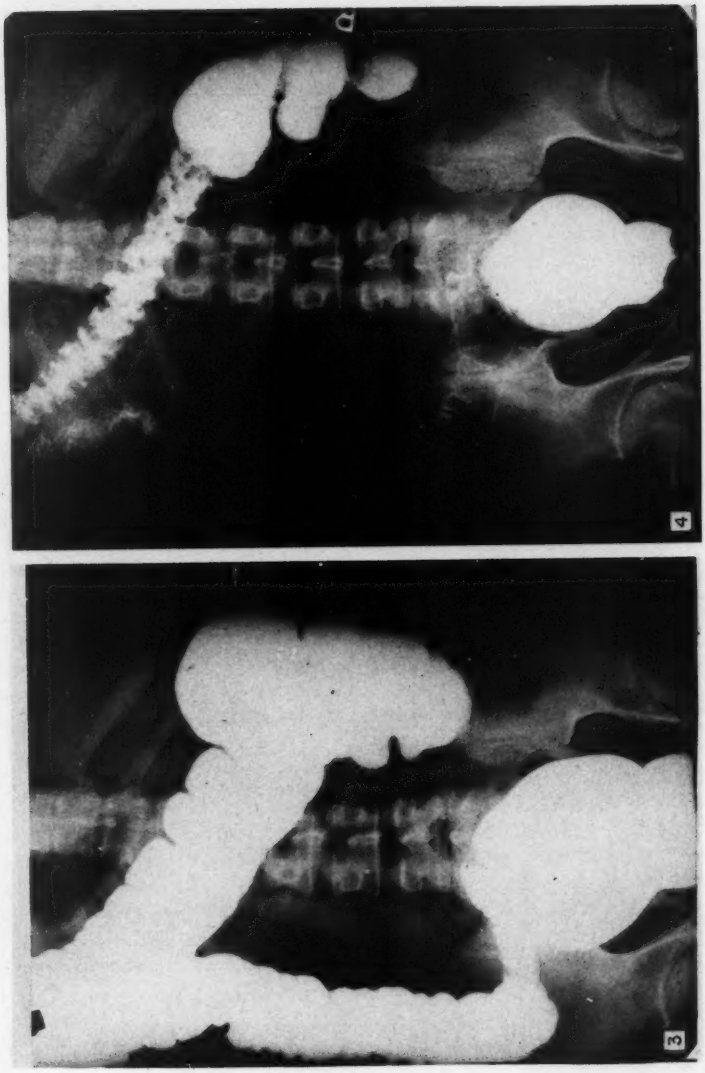
Figures 1 and 2. Preoperative barium enema showing megacolon.

the sigmoid shortly thereafter became easier and the fecal material thus obtained was liquid or mushy. The patient's temperature fell to normal on several days after treatment with aureomycin was started but occasionally reached 101° F. in the afternoon. An attempt was made to supplement the patient's oral intake of food by daily giving dextrose and amigen intravenously. On 31 July treatment with succinylsulfathiazole was started in a further attempt to sterilize the bowel postoperatively. The consensus was that we probably would be unable to eliminate this man's periodic elevations in temperature without removing the infected colon and its mesenteric attachments. On 3 August a laparotomy through the left rectus abdominis muscle was performed. The sigmoid and lower portion of the descending colon were greatly distended. Their mesenteric attachments were thickened and contained many swollen lymph nodes. The dilatation appeared to end at the ampulla of the rectum. The dilated colon was removed down to the peritoneal reflection about the rectum where a primary anterior anastomosis was performed, using intestinal chromic catgut for the inner layer suture and 000 silk for the seromuscular sutures. After covering the raw areas with peritoneum the abdomen was closed in layers. The appendicostomy catheter was permitted to remain in place during the operation and throughout the postoperative course.

The pathologist reported that the gross specimen consisted of a segment of large intestine measuring 32.5 cm. in length. Most of it was greatly dilated, the circumference being 16 cm. Toward one end it narrowed to 8 cm. The dilated portion showed hypertrophy of the muscular coat to a thickness of 0.6 cm. as compared with 0.2 cm. in the narrow segment. The mucosa presented unevenly distributed, superficial brown-colored ulcers. Microscopically, there was evidence of both acute and chronic ulcerative colitis. In the narrower segment, the myenteric plexus was so scanty that it could hardly be recognized. A diagnosis of congenital megacolon, with acute and chronic ulcerative colitis was made.

Postoperatively the patient was allowed up on the first day. Penicillin, streptomycin, and aureomycin were given parenterally. Intravenous feeding was employed until the seventh postoperative day. Normal peristaltic sounds were heard and the patient passed gas on the sixth postoperative day. Feeding by mouth was started on the seventh postoperative day. The patient had a normal bowel movement on the tenth postoperative day and from that time on had 1 or 2 normal, formed stools daily. No disturbance in electrolyte balance occurred postoperatively.

On the twelfth postoperative day, the patient gradually developed a pleuritic pain in the lower anterior portion of the chest on the right side. At that time, his temperature reached 101° F. and a roentgenogram of the chest revealed streaked densities in the base of both lungs suggestive of atelectasis. Bronchoscopy was negative and examination of



Figures 3 and 4. Postoperative barium enema.

the lower extremities was negative. The leukocyte count was 22,000. It was believed that a pulmonary infarction had occurred and the patient was placed on heparin and dicumarol. The dicumarol was continued for 20 days. His symptoms and physical findings rapidly disappeared and his temperature became normal on the seventeenth postoperative day. He was discharged on 6 September. A postoperative barium enema (figs. 3 and 4) showed a marked improvement in his colon.

The patient was last seen in the clinic on 26 September, at which time he was having daily bowel movements, his abdomen was soft and scaphoid, and he had had no further thoracic difficulty. He was advised not to undergo operation for his right rectus incisional hernia and correction of his appendicostomy for at least a year. He wore an abdominal support for control of his old incisional hernia.

BOOK REVIEWS

Diabetes Control, by *Edward L. Bortz*, M. D., Chief of Medical Service B, The Lankenau Hospital; Associate Professor of Medicine, Graduate School of Medicine, University of Pennsylvania, Philadelphia; former President of the American Medical Association. 264 pages; illustrated. Lea & Febiger, Philadelphia, Pa., publisher, 1951. Price $3.50.

Although this manual is written primarily for the diabetic, potential diabetic, or parents of a diabetic child, every physician who treats such patients would do well to be familiar with Dr. Bortz's remarkable approach to these patients. Proceeding from the idea that that which one understands is not to be feared, the author covers every aspect of this disease which should be familiar to the diabetic patient. In straightforward language, beautiful for its simplicity, he tells what diabetes is, what causes it, what symptoms to watch for, how it is controlled, and what complications to watch for and prevent. Of special interest and of practical importance is the chapter on meal planning with numerous menus and simplified methods of calculating diets from lists of interchangable foods. The new carbohydrate values accepted by the American Diabetes Association, the American Dietetic Association, and the U. S. Public Health Service are followed throughout. Typical of the many useful hints on this subject is the statement that: "It is a much better plan to take foods allowed and fit them into the recipe than to take the entire recipe and fit it into your diet." Obesity and malnutrition are discussed at length in the chapter on weight control. Special diets and corrective exercises are given. Full attention is given to the psychologic aspects of the disease. The use of standard, protamine zinc, crystalline zinc, globin, and the new neutral protamine

Hagedorn insulin is discussed. Modern views on methods of administration, time, quantity, and technic are detailed. A special feature is a section containing 75 questions and answers on subjects pertinent to diabetes control. The author's flare for teaching is evident from the repetition of important points and his genius for reassuring the patient adds to the value of the book.

—*Commander H. L. Jones, Jr., MC, U. S. N.*

Surgical Care, A Practical Physiologic Guide, by *Robert Elman,* M. D., F. A. C. S., Professor of Clinical Surgery, Washington University School of Medicine; Assistant Surgeon, Barnes Hospital; Associate Surgeon, St. Louis Children's Hospital; Director of Surgical Service, H. G. Phillips Hospital, St. Louis, Mo. 586 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., publishers, 1951. Price $8.

This guide to the care of the surgical patient has been prepared with the assistance of 27 nationally known specialists as collaborators. It integrates much of the recent and current literature with the authors' personal experience and views, and the application of physiologic principles is constantly emphasized. In the introductory chapter, surgical risk is analyzed from the point of view of the physical state of the patient and the influence of age. A chapter on the systemic reaction to trauma presents clearly the current status of our knowledge of the pituitary-adrenal reaction to stress. A chapter on psychogenic factors, with a survey of relationship of the patient to the hospital staff, and of the hospital staff to one another follows. Nutrition, physical factors in surgery, preoperative care, anesthesia, and recovery are discussed in detail. Postoperative care, management of complications, chemotherapy, and burn therapy are presented in the other chapters. In all, a variety of situations are presented which are frequent problems in any active surgical service, many of which make life difficult for the surgeon and his staff. Illustration of some of these problems by case histories is especially valuable. These reflect the personal experiences of the author and are especially illuminating. Some of the topics are controversial and although those familiar with specific aspects may not agree with some of the points of view taken, they will enjoy reading the authors' views. This book is too large for cursory reading. It is an excellent reference and text, however, and should be available to all those engaged in the care and management of surgical patients, particularly the house officer.—*Lt. Col. E. J. Pulaski, MC, U. S. A.*

Diabetic Lipemia Retinalis[1]

Rudolph P. Nadbath, *Lieutenant Commander, MC, U. S. N.*

Louis Z. Fauteux, Jr., *Lieutenant, junior grade, MC, U. S. N. R.*

HEYL (2), in 1880, first described the condition now known as "lipemia retinalis." Since then about 70 patients, most of whom were diabetic, have been reported as having had this condition. In addition to diabetes mellitus, pneumonia, nephritis, myxedema, and phosphorus poisoning may cause retinal lipemia. Wagener (3) reported the first case of lipemia retinalis in a nondiabetic. The patient was 9 years old and had lymphatic leukemia. The manifestations of lipemia retinalis developed 2 weeks after radiation therapy. Holt et al. (4) reported 2 patients with familial lipemia of undetermined origin in whom retinal lipemia was manifest. These authors believed their cases demonstrating lipemia, hepatomegaly, splenomegaly, psoriasis, and peculiar ulcerations of the skin represented anomalous lipid metabolism similar to that in familial splenic anemia or lipoid histiocytosis. Kauffman (5), reported a nondiabetic Negro who showed transient lipemia retinalis. Lepard (6), Grossmann and Hitz (7), Groom and Rucker (8), and, most recently, Sullivan and Pennypacker (9) reported other cases of lipemia retinalis in nondiabetic patients.

Lipemia retinalis, judged by the number of reported cases, is not a common condition (10-12). Most patients are between the ages of

(1) From the U. S. Naval Hospital, Portsmouth, Va.

(2) Heyl, A. G.: Intraocular lipemia. Tr. Am. Ophth. Soc. 3: 54, 1880.

(3) Wagener, H. P.: Lipemia retinalis. Am. J. Ophth. 5: 521-525, July 1922.

(4) Holt, L.; Aylward, F.; and Timbres, H.: Familial lipemia of undetermined origin. J. Clin. Investigation 15: 451, July 1936.

(5) Kauffman, M. L.: Lipaemia Retinalis Am. J. Ophth. 26: 1205-1208, Nov. 1943.

(6) Lepard, C. W.: Lipemia retinalis in the nondiabetic patient. Arch. Ophth. 32: 37-38, July 1944.

(7) Grossmann, E. E., and Hitz, J. B.: Lipemia retinalis associated with essential hyperlipemia. Arch. Ophth. 40: 570-573, Nov. 1948.

(8) Groom, J. J., and Rucker, C. W.: Nondiabetic lipemia retinalis. Am. J. Ophth. 33: 1238-1240, Aug. 1950.

(9) Sullivan, M. B., Jr., and Pennypacker, P. H.: Lipemia retinalis. U. S. Armed Forces M. J. 2: 479-482, Mar. 1951.

(10) Troncoso, M. U.: Internal Diseases of the Eye and Atlas of Ophthalmoscopy. F. A. Davis Co., Philadelphia, Pa., 1942. pp. 332-333.

(11) Duke-Elder, W. S.: Text-book of Ophthalmology, Vol. 3. C. V. Mosby Co., St. Louis, Mo., 1940 (reprinted 1945). pp. 2742-2743.

(12) Elwyn, H.: Diseases of the Retina. The Blakiston Co., Philadelphia, Pa., 1946. p. 106.

20 and 30 years, although the disease has been observed in patients from 2 to 60 years of age. There appears to be a greater incidence among women than among men. The association of the disease with diabetes has been attributed to the increase in blood lipid constituents which characteristically occurs in the acidotic and comatose states. Although a blood lipid level in excess of 3.5 percent is generally considered necessary before retinal lipemia is manifest, Chase *(13)* reported the condition to have been present in a patient whose blood lipid level was 1.52 percent, and Jaffe and Schonfeld *(14)* reported the disappearance of the retinal changes in a diabetic patient whose level dropped from 21.7 to 16.3 percent. Unfortunately, the blood lipid percentage was not determined in our patient at the time the retinal changes became absent.

The pathogenesis of lipemia retinalis is not clearly understood. Boyd *(15)* is of the opinion that the blood lipids are maintained in solution by the phospholipid fraction, a depletion of which allows the other lipid fractions to separate from the blood with the formation of the typical milky serum. There is good evidence that the liver is the main site of plasma phospholipid formation *(16)*. It may be reasoned that because of the deranged metabolism of fat which occurs in the liver in uncontrolled diabetes, the synthesis of lecithin is impaired with the result that the blood phospholipid is diminished below the level at which the other lipids are maintained in solution.

The changes in the fundus are pathognomonic. The retinal vessels appear light pink, salmon, waxy, or entirely white in color, as if filled with milk. The arteriolar and venous branches of the retinal bed are alike. The words "flat" and "ribbonlike" are highly descriptive of the appearance of the retinal vascular tree. The fundus changes are most pronounced toward the periphery and it is in this region that the earliest changes are first noted, the vessels near the disk appearing to be normal, but reversal or improvement in these findings occur first about the disk and then continue toward the periphery.

With the advent of insulin therapy the prognosis in these patients is, in general, the same as the prognosis of any diabetic in or near coma, but indiscretions or intercurrent infeotions are disastrous for the diabetic who has or is showing signs of lipemia retinalis.

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(13) Chase, L. A.: Diabetic lipemia retinalis; report of case. J. A. M. A. 97: 171-172, July 18, 1931.

(14) Jaffe, M, and Schonfeld, W. A.: Lipemia retinalis due to diabetes mellitus, with report of case. Arch. Ophth. 9: 531-537, Apr. 1933.

(15) Boyd, E. M.: Lipid composition of "milky" blood serum. Tr. Roy. Soc. Canada 31: 11-16, July 1937.

(16) Fishler, M. C.; Entenman, C.; Montgomery, M. L.; and Chaikoff, I. L.: Formation of phospholipid by hepatectomized dogs as measured with radioactive phosphorus; site of formation of plasma phospholipids. J. Biol. Chem. 150: 47-55, Sept. 1943.

CASE REPORT

A 42-year-old man was admitted to this hospital on 30 August 1951. Shortly after returning to the United States from Germany 6 weeks prior to admission he began to have a feeling of fullness in the epigastrum not related to meals and constipation. He had lost 20 pounds and noted excessive thirst, urinary frequency, and nocturia. About 10 hours prior to admission, he suddenly developed a constant dull aching discomfort in the right upper quadrant of the abdomen. Several hours before admission he vomited.

His father died at the age of 47 years from pernicious anemia. There was no family history of diabetes mellitus.

On physical examination he appeared to be acutely ill and showed evidence of dehydration. His temperature was 98.2° F. His pulse was 142. His blood pressure was 120/70. The turgor of his skin was poor. There were no cutaneous xanthomata. The eyes appeared to be somewhat sunken in the orbits and in a position of orthophoria. The optic disks were normal in appearance. The vessels in the physiologic pits which coursed over and slightly beyond the disks were also normal but about 1 disk-diameter from each disk the vessels assumed a light salmon color and from this point as far toward the periphery as they could be seen the vessels were "flat ribbons" of a creamy hue. The point of each crossing of these ribbons with one another showed no apparent compression or displacement phenomenon, the ribbons all being of uniform width and about 1.5 times the width of normal veins. For any given section of such a ribbon its origin, whether venous or arteriolar could not be determined unless it was traced toward the disk. There was no perivasculitis, but here and there for short distances some ribbons had a red margin. Each of the maculas showed a stippled bronzing. The foveolar light reflex was absent. The oral mucosa was dry and the tongue was of a leathery consistency. There was moderate tenderness in the epigastrium and in the right upper abdominal quadrant.

On admission the urine was strongly positive for sugar and acetone. The blood sugar was 340 mg. per 100 cc. The carbon dioxide combining power was 32 volumes percent. The blood urea nitrogen was 10.5 mg. per 100 cc. A thick creamy supernatant was noted on all specimens of blood. The chlorides were 560 mg. per 100 cc. The total serum cholesterol was 1200 mg. per 100 cc. with 383 mg. of cholesterol esters per 100 cc. The total serum lipid content was 7,000 mg. per 100 cc. No facilities were available for performing lecithin and phospholipid analysis.

The patient was given 50 units of regular insulin and was started on physiologic saline solution intravenously. Urine sugar and acetone determinations were made every 2 hours and regular insulin was given subcutaneously according to the qualitative degree of glycosuria and acetonuria. A total of 285 units of regular insulin were given in the

first 24 hours together with a total of 7,780 cc. of fluids. There was a lessening of the glycosuria and acetonuria so that 36 hours following admission a trace of sugar without acetone was present. The patient was started on a diabetic diet containing 2,240 calories, 110 grams of protein, 80 grams of fat, and 270 grams of carbohydrate. Ophthalmoscopic examination 24 hours after admission revealed normal appearing disks and maculas. The retinal vascular tree revealed grade 1 narrowing and grade 1 sclerosis (Keith-Wagener classification). The choroidal bed was essentially normal in appearance although in a few small areas there were signs of early choroidal sclerosis.

On 3 September the patient was started on 30 units of protamine zinc insulin daily and on 6 September this was increased by giving an additional 25 units of regular insulin before breakfast each morning. The diet was changed on 4 September to 2,020 calories (110 grams of protein, 60 of fat, and 260 of carbohydrate). The insulin requirement was changed to a mixture of 20 units of protamine zinc insulin and 40 units of regular insulin daily. On 5 September a slit-lamp examination revealed in each lens some anterior subcapsular peripheral spoking and the faintest suggestion of nuclear sclerosis. The funduscopic findings under full mydriasis revealed the findings as found on 31 August 1951 and have remained unchanged to date.

TABLE 1. *Blood chemistry determinations*

Date	Fasting blood sugar (mg. per 100 cc.)	Cholesterol (mg. per 100 cc.)	Cholesterol ester (mg. per 100 cc.)
30 Aug.	340	1200	383
31 Aug.	140	974	---
6 Sept.	243	500	---
13 Sept.	115	600	---
21 Sept.	208	470	---

The diet was finally adjusted to 1980 calories (110 grams of protein, 56 of fat, and 260 of carbohydrate) and the insulin dosage to a mixture of 15 units of protamine zinc insulin and 30 units of regular insulin. The blood chemistry determinations are summarized in table 1.

Incidence of Amebiasis in Korean Veterans

Ryle A. Radke, *Colonel, MC, U. S. A.* (*1*)

SIGMOIDOSCOPIC examination for amebiasis after the technic described by Radke (*2*) was performed on 93 Korean campaign veterans who were admitted to the medical service of this hospital with malaria. All of these men were soldiers who had seen active combat recently. Of the 93 who were examined 47 were positive for *Endameba histolytica.* A series of 3 stools after saline purge from 50 of these patients were also examined for *E. histolytica.* The data from the stool specimens and the sigmoidoscopic examinations from these patients are shown in table 1.

TABLE 1. *Results of examination for* E. histolytica *of 50 patients with malaria*

	Number
Sigmoidoscopic specimens, positive; stool specimens negative.	23
Stool specimens positive; sigmoidoscopic specimens, negative.	3
Stool specimens positive; sigmoidoscopic specimens, positive.	7
Total	33

From the above data it appears that amebiasis is a disease of military significance in the Korean campaign. This does not indicate that the general incidence of the disease in the Korean troops is of this magnitude because the soldiers in actual combat are living under less sanitary conditions than are the supporting troops. The data serve to emphasize the necessity for employing every means available for the demonstration of *E. histolytica* when the history or physical findings suggest its presence.

(*1*) U. S. Army Hospital, Fort Knox, Ky.

(*2*) Radke, R. A.: Treatment of amebiasis with atabrine combined with carbarsone. Ann. Int. Med. 34: 1432-1444, June 1951.

BOOK REVIEW

Tumors of the Skin, Benign and Malignant, by *Joseph Jordan Eller,* B. S., M. D., Director of the Department of Dermatology, New York City Hospital, N. Y.; Consulting Dermatologist to: French Hospital, New York; Morristown Memorial Hospital, Morristown, N. J.; Monmouth Memorial Hospital, Long Branch, N. J.; Fitkin Memorial Hospital, Asbury Park, N. J.; Norwalk General Hospital, Norwalk, Conn.; St. Clare Hospital, New York; Member: American Dermatological Association, American Board of Dermatology and Syphilology; Academy of Dermatology and Syphilology, etc.; and *William Douglas Eller,* M. D., Assistant in Dermatology and Syphilology, University Hospital, New York-Bellevue Medical Center; Associate Attending Dermatologist, New York City Hospital; Visiting Dermatologist, Municipal Sanitarium, Otisville, New York, etc. 2d edition, thoroughly revised and enlarged. 697 pages; 550 illustrations and 3 colored plates. Lea & Febiger, Philadelphia, Pa., publisher, 1951. Price $15.

This book is a thorough revision of the first edition. The most recently described neoplasms of the skin and mucous membranes have been included. The number of illustrations has been generously increased. Each tumor is discussed from the standpoint of etiology, clinical appearance, course, histopathology, and treatment. The use of x-ray and radium in treating the various tumors of the skin is discussed in detail, including the recommended methods and dosages. Electrosurgical and surgical methods of treatment are also described. One chapter is devoted to the technic of cutaneous surgery and plastic repair of skin tumors. Another chapter is devoted to radiation physics and includes a number of useful tables and charts. The bibliography is comprehensive and up-to-date. Although this book will be of most value to the dermatologist, the surgeon, and the radiation therapist; the excellent descriptions and illustrations of such conditions as precancerous dermatoses, nevi, malignant melanomas, carcinomas, and lymphomas should render it useful to other specialists and to the general practitioner.

—*Commander J. W. Albrittain, MC, U. S. N.*

BOOKS RECEIVED

A Course in Practical Therapeutics, by *Martin Emil Rehfuss*, M. D., F. A. C. P., Professor of Clinical Medicine and Sutherland M. Prevost Lecturer in Therapeutics, Jefferson Medical College, Philadelphia; Attending Physician, Jefferson Medical College Hospital, Philadelphia, and *Alison Howe Price*, A. B., M. D., Associate Professor of Medicine, Jefferson Medical College, Philadelphia; Asst. Physician to Jefferson Medical College Hospital, Philadelphia; Chief of Diabetic Clinic, Curtis Clinic, Philadelphia. 2d edition. 938 pages; illustrated. The Williams & Wilkins Co., Baltimore, Md., publisher, 1951. Price $15.

The 1951 Year Book of Radiology (June 1950-June 1951). Radiologic Diagnosis, edited by *Fred Jenner Hodges*, M. D., Professor and Chairman, Department of Roentgenology, University of Michigan, and *John Floyd Holt*, M. D., Associate Professor, Department of Roentgenology, University of Michigan. Radiation Therapy, edited by *Harold W. Jacox*, M. D., Professor of Radiology, College of Physicians and Surgeons, Columbia University; Chief, Radiation Therapy Division, Radiologic Service, Presbyterian Hospital, New York City, and *Vincent P. Collins*, M. D., Associate Professor of Radiology, College of Physicians and Surgeons, Columbia University; Director, Department of Radiation Therapy, Francis Delafield Hospital; Attending Radiologist, Presbyterian Hospital, New York City. The Year Book Publishers, Inc., Chicago, Ill., publisher, 1951. Price $7.

Your Diabetes, A Complete Manual for Patients, by *Herbert Pollack*, M. D., Associate Physician for Metabolic Diseases, Mount Sinai Hospital, New York. *Marie V. Krause*, M. S., Consulting Dietician. Revised edition. 212 pages. Paul B. Hoeber, Inc., New York, N. Y., publisher, 1951. Price $3.

Surgical Practice of the Lahey Clinic, by *Members of the Staff of the Lahey Clinic*, Boston. 1014 pages; 784 illustrations on 509 figures. W. B. Saunders Co., Philadelphia, Pa., publisher, 1951. Price $15.

Curare and Anti-Curare Agents, by *K. R. Unna* (Conference Chairman), *J. F. Artusio, A. L. Bennett, B. Berman, D. Bovet, J. C. Castillo, A. D. Console, M. A. Crews, E. J. De Beer, J. D. Dutcher, C. Eyzaguirre, R. V. Faneilli, F. F. Foldes, E. D. Goldsmith, H. R. Griffith, C. Hamilton, J. O. Hoppe, L. W. Jarcho, J. L. Lilienthal, Jr., A. R. McIntyre, B. E. Marbury, D. F. Marsh, S. Norton, W. D. M. Paton, E. W. Pelikan, A. P. Phillips, L. O. Randall, W. F. Riker, Jr., E. H. Sevringhaus, W. C. Wescoe*, and *A. L. Wnuck*. Editor: *Roy Waldo Miner; Associate* Editor: *B. J. Henegan;* Consulting Editor: *J. A. Aeschlimann*. Annals of the New York Academy of Sciences, Volume 54, Art. 3, pages 297-530. 233 pages; illustrated. New York Academy of Sciences, New York, N. Y., publisher, October 30, 1951. Price $4.

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Antibiotic Therapy, by *Henry Welch*, Ph. D., Director, Division of Antibiotics, Food and Drug Administration, Federal Security Agency of the United States Government, and *Charles N. Lewis*, M. D., Medical Officer, Division of Antibiotics, Food and Drug Administration, Federal Security Agency of the United States Government. Foreword by *Chester S. Keefer*, M. D., Wade Professor of Medicine, Boston University School of Medicine; Chairman, Committee on Medicine and Chairman, Committee on Chemotherapy of the National Research Council. 562 pages. The Arundel Press, Inc., Washington, D. C., publisher, 1951. Price $10.

Roentgen Examinations in Acute Abdominal Diseases, by *J. Frimann-Dahl*, M. D., Ph. D., Chief of Roentgen Department, Ulleval Hospital, Oslo, Norway. 323 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $10.50.

A Dictionary of Antibiosis, Compiled by *Leonard Karel*, National Institutes of Health, United States Public Health Service, Federal Security Agency, and *Elizabeth Spencer Roach*. 373 pages. Columbia University Press, New York, N. Y., publisher, 1951. Price $8.50.

The United States Public Health Service, 1798-1950, by *Ralph Chester Williams*, M. D., Assistant Surgeon General United States Public Health Service, Washington, D. C. 890 pages; illustrated. Commissioned Officers Association of the United States Public Health Service, Bethesda, Md., publisher, 1951. Price $7.50.

The Genetics of Micro-Organisms, by *D. G. Catcheside*, Reader in Plant Cytogenetics, University of Cambridge; Fellow of Trinity College, Cambridge. 223 pages; illustrated. Pitman Publishing Corporation, New York, N. Y., 1951. Price $4.50.

A Study of Antimetabolites, by *D. W. Woolley*, Member, The Rockefeller Institute for Medical Research. 269 pages; illustrated. John Wiley & Sons, Inc., New York, N. Y., publisher, 1951. Price $5.

The Battle for Mental Health, by *James Clark Moloney*, M. D. 105 pages. Philosophical Library, New York, N. Y., publisher, 1951. Price $3.50.

The 1951 Year Book of Drug Therapy (September 1950-August 1951), Edited by *Harry Beckman*, M. D., Director, Departments of Pharmacology, Marquette University Schools of Medicine and Dentistry; Consulting Physician, Milwaukee County General and Columbia Hospitals, Milwaukee, Wis. 502 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1951. Price $5.

Electrocardiographic Studies in Normal Infants and Children, by *Robert F. Ziegler*, M. D., Associate in Cardiology, In Charge of Section of Pediatric Cardiology, Henry Ford Hospital, Detroit, Mich. 207 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $10.50.

The Pathogenesis of Tuberculosis, by *Arnold R. Rich*, M. D., Baxley Professor of Pathology, The Johns Hopkins University School of Medicine; Pathologist-in-Chief, The Johns Hopkins Hospital, Baltimore, Md. 2d edition. 1028 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $15.

Physical Medicine and Rehabilitation for the Aged, by *Walter S. McClellan*, M. D., Medical Director, The Saratoga Spa, Saratoga Springs, New York; Associate Professor of Medicine, Albany Medical College, Albany, N. Y. American Lecture Series Publication No. 105, A Monograph in American Lectures in Physical Medicine. 81 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $2.

The Temporomandibular Joint, Edited by *Bernard G. Sarnat,* M. S., M. D., D. D. S., F. A. C. S., Professor and Head of The Department of Oral and Maxillofacial Surgery, College of Dentistry; Clinical Assistant Professor Department of Surgery (Plastic Surgery), College of Medicine, University of Illinois, Chicago, Ill.; Diplomate of the American Board of Plastic Surgery. American Lecture Series Publication No. 134, A Monograph in American Lectures in Dentistry. 148 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $4.75.

Formulary and Therapeutic Guide, by *R. Gordon Douglas,* Chairman; *Donald A. Clarke,* Secretary; and *Norman Baker, Henry Barnett, McKeen Cattell, Herbert Conway, Cary Eggleston, August Groeschel, Vassar Johnson, Vernon Knight,* and *Ade Milhorat.* 355 pages. Appleton-Century-Crofts Co., Inc., New York, N. Y., publisher, 1951. Price $3.

Measurement and Evaluation in Physical, Health, and Recreation Education, by *Leonard A. Larson,* B. A., B. P. E., M. Ed., Ph. D., Professor of Education, New York University, and *Rachael Dunaven Yocom,* B. A., M. A., Ph. D., Instructor in Education, New York University. 507 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., publisher, 1951. Price $7.50.

Cardiac Pain, by *Seymour H. Rinzler,* M. D., F. A. C. P., Adjunct in Medicine and Cardiovascular Research Unit, Beth Israel Hospital; Instructor in Rehabilitation, New York University College of Medicine; Associate Visiting Physician, Bellevue Hospital, New York City. American Lecture Series Publication No. 113, A Monograph in American Lectures in Circulation. 139 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $3.75.

Rehabilitation Nursing, by *Alice B. Morrissey,* B. S., R. N., Instructor in Rehabilitation Nursing, New York University-Bellevue Medical Center; Supervisor of Nursing Service, Department of Physical Medicine and Rehabilitation, Bellevue Hospital. Foreword by *Howard A. Rusk,* M. D., Professor and Chairman of the Department of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center; Associate Editor, The New York Times. 299 pages; illustrated. G. P. Putnam's Sons, New York, N. Y., publisher, 1951. Price $5.

Penicillin Decade, 1941 - 1951, Sensitizations and Toxicities, by *Lawrence Weld Smith,* M. D., Medical Director, Commercial Solvents Corporation, and *Ann Dolan Walker,* R. N., Former Editor, "Trained Nurse and Hospital Review." 122 pages. Arundel Press Inc., Washington, D. C., publisher, 1951. Price $2.50.

Surgery of the Oblique Muscles of the Eye, by *Walter H. Fink,* M. D., Minneapolis, Minn. 350 pages; 93 illustrations, including 18 in color. The C. V. Mosby Co., St. Louis, Mo., publisher, 1951. Price $8.75.

Observations on the General Effects of Injury in Man, With Special Reference to Wound Shock, by *R. T. Grant* and *E. B. Reeve.* Privy Council. Medical Research Council Special Report Series No. 277. 313 pages. His Majesty's Stationery Office, London, publisher, 1951. Price about $1.20.

Air War and Emotional Stress, Psychological Studies of Bombing and Civilian Defense, by *Irving L. Janis,* member The Rand Corporation. 280 pages. McGraw-Hill Book Company, Inc., New York, N. Y., publisher, 1951. Price $5.00.

A Translation of Galen's Hygiene (De Sanitate Tuenda), by *Robert Montraville Green,* M. D., Emeritus Professor of Anatomy, Harvard Medical School, Boston, Mass., with an Introduction by *Henry E. Sigerist,* M. D. 277 pages. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $5.75.

Aphorisms of Dr. Charles Horace Mayo, 1865-1939, and Dr. William James Mayo, 1861-1939, collected by *Fredrick A. Willius,* M. D. 109 pages. Charles C Thomas, Publisher, Springfield, Ill., 1951.

Nutrition and Climatic Stress, with Particular Reference to Man, by *H. H. Mitchell,* Professor of Animal Nutrition, University of Illinois, and *Marjorie Edman,* Research Assistant in Animal Nutrition in Charge of Literature Survey, University of Illinois. 234 pages. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $6.75.

The Cure of Rheumatoid Arthritis by Physical Medicine, A Result of Thirty Years' Study (Original Investigations), by *Joseph Echtman,* M. D., Formerly in charge Clinic of Physical Medicine, Mount Sinai Hospital, Stuyvesant Polyclinic Hospital, Beth David Hospital; Physician and Lecturer in Physical Medicine, New York Medical College and Flower Fifth Avenue and Metropolitan Hospitals; Physician, Cardiac Clinic, Mount Sinai Hospital, etc.; Member, American Congress of Physical Medicine, New York Physical Medicine Association, New York Heart Association, American Rheumatism Association, World Medical Association, American Medical Association, New York County Medical Association, etc. 251 pages; illustrated. Herald Square Press, Inc., New York, N. Y., publisher, 1951.

Hypertension, A Manual for Patients with High Blood Pressure, by *Irvine H. Page,* A. B., M. D., Director, Research Division, Cleveland Clinic Foundation, Cleveland, Ohio. 6th printing. 101 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $3.

Pathology of the Fetus and the Newborn, by *Edith L. Potter,* M. D., Ph. D., Associate Professor of Pathology, Department of Obstetrics and Gynecology, The University of Chicago; Pathologist, The Chicago Lying-in Hospital; Chief Pathologist, the Chicago Department of Health. 574 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1952. Price $19.

Disorders of the Heart and Circulation, edited by *Robert L. Levy,* M. D., Professor of Clinical Medicine, College of Physicians and Surgeons, Columbia University; Attending Physician, Presbyterian Hospital, New York. 944 pages; illustrated. Thomas Nelson & Sons, New York, N. Y., publisher, 1951. Price $12.

Clinical Pathology of the Eye, A Practical Treatise of Histopathology, by *Bernard Samuels,* M. D., Emeritus Clinical Professor of Ophthalmology, Cornell University Medical College; Consulting Ophthalmologist, New York Hospital; Acting Advisory Surgeon and Consulting Pathologist, New York Eye and Ear Infirmary; and *Adalbert Fuchs,* M. D., E. O. Professor of Ophthalmology, University of Vienna; Consulting Ophthalmologist and Pathologist, New York Eye and Ear Infirmary. 420 pages; 418 illustrations, 191 in color. Paul B. Hoeber, Inc., New York, N. Y., publisher, 1952. Price $20.

BOOK REVIEWS

The Scientific Paper, How to Prepare It, How to Write It, A Handbook for Students and Research Workers in all Branches of Science, by *Sam F. Trelease,* Columbia, University. 2d edition. 163 pages. The Williams & Wilkins Co., Baltimore, Md., publishers, 1951. Price $2.50.

If this small handbook were read and referred to by all authors of scientific manuscripts the task of editors of medical journals would be lightened. In addition, these same authors would find that more of their efforts would be accepted for publication and would appear in print much sooner than at present because much current editing would be unnecessary. Thoroughly revised and rewritten since the first edition was published in 1947 under the title, *Preparation of Scientific and Technical Papers,* this volume provides the guide rules by which a qualified technical specialist may prepare an acceptable paper in his field. It may not make writing any easier but, certainly, it will assist the prospective author to become more proficient. Dr. Trelease describes briefly the manner in which a subject or problem may be presented, drawing attention to the many aids and tools found in libraries and reference literature. Next, in logical sequence, the complete preparation of a paper from the original outline of ideas to the final typewritten manuscript is described. Adequate attention is given to good form, proper style, the selection of illustrations, and such technical details as footnotes, citations, abstracts, quotations, acknowledgments, proofreading, and bibliography. This volume is recommended for all medical authors, even those with published papers to their credit, who wish to improve their technical writing.

—*Col. R. J. Benford, U. S. A. F. (MC)*

Outline of Fundamental Pharmacology, The Mechanics of the Interaction of Chemicals and Living Things, by *David Fielding Marsh,* Professor and Head of the Department of Pharmacology, West Virginia University School of Medicine, Morgantown, W. Va. 219 pages. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $6.

The author of this book has made a serious attempt to define the field of the pharmacologist, to suggest problems in that field that need to be investigated and methods of procedure for getting the desired data with the most economical use of time and materials, and to point out errors in certain methods of investigation and evaluation of results. After a preliminary review of the development of modern pharmacology, the

author procedes with a discussion of dose-effect relationship; localization of site of action; absorption and distribution; fate of drugs; mechanism of action; chemical constitution and biologic action; and applied pharmacology. The material is carefully chosen and well presented. The bibliographies are comprehensive and valuable. For anyone entering the field of experimental pharmacology it will serve as a stimulating introduction to problems and procedures. To those working in allied sciences it should provide an understanding of the relationship of pharmacology to other branches of medical science, and even for the general reader it has a great deal to offer in interesting information.—*Commander R. L. Taylor, MSC, U. S. N.*

Autopsy Diagnosis and Technic, by *Otto Saphir*, M. D., Pathologist, Michael Reese Hospital; Clinical Professor of Pathology, University of Illinois Medical School, Chicago. Foreword by *Ludvig Hektoen*, M. D. 3d edition, revised and enlarged. 471 pages; illustrated. Paul B. Hoeber, Inc., New York, N. Y., publisher, 1951. Price $6.

This book is well written and interestingly presented. It is well illustrated with black and white drawings which demonstrate technics far better than printed words. I do not believe that this book would be of great value to a specialist in anatomic pathology, but its value should be tremendous to the beginner in pathology, and especially to the physician who only occasionally performs an autopsy. Many important details not ordinarily considered as a part of an autopsy are discussed. For example, the autopsy permit is described fully.

The autopsy procedure is discussed systematically from the external examination of the body to dissection of joints, peripheral nerves, et cetera. A special chapter is included on the autopsy of the stillborn. The various organ systems are taken up systematically, in each case describing normal appearance before the abnormal. The most common abnormalities are described succinctly along with the most common disease conditions which might produce such abnormalities. In nearly all chapters, tables giving the differential diagnostic features of lesions most commonly found in the organ system under discussion are included.—*Col. R. P. Mason, MC, U. S. A.*

The Normal Cerebral Angiogram, by *Arthur Ecker*, M. D., Ph. D. (Neurology), Surgical Neurologist, Syracuse, N. Y. 190 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $6.50.

This book is an inevitable and necessary evolution of the present day rapidly accumulating masses of arteriogram studies. It contains the detailed anatomy of all the major vessels from their arterial entrance into the cranial vault to their venous exit from the skull. The first half of the book contains many practical points for locating and injecting carotid and vertebral arteries by the percutaneous method. The author offers the reader the technical tricks which he has developed as a result of experience. The cause, prevention, and treatment of 17 complications of arteriography (most are minor) are discussed.

The most welcome contribution is the anatomic detail which will help the clinician identify early peculiarities in distorted structure of the vascular tree. Embryologic background is suggested for certain abnormalities such as the carotid-basilar anastomosis. The discussion of the positions of the primitive olfactory artery is an example of the completeness and extent of the anatomic detail. The value of special roentgenographic views for enlarging the scope of the arteriographer's diagnosis is shown in several instances; for example, an optic foramen view was used to show arterial encroachment on the optic nerve in a patient with inferior altitudinal anopsia.

The author's system of numbering portions of the middle, anterior, and carotid arteries would seem to require learning certain bits of their anatomy by rote. It would have helped if they were given anatomic names rather than the oversimplified nomenclature of A2, C3, et cetra.

The venous anatomy is thoroughly discussed and well illustrated both by drawings and roentgenograms. Common artefacts and their identification and prevention are described. The last chapter is devoted to vascular relations to the tentorial notch and the foramen magnum with special emphasis on the knowledge of the normal anatomy of the posterior course of the anterior choroidal artery and the normal curvatures of the posterior inferior cerebellar artery.

This book will be welcomed by neurosurgeons, radiologists, and neurologists because of the ready availability of fine points in cerebral vascular anatomy in one well-indexed and well-illustrated volume.

—*Lt. Comdr. G. Clark, MC, U. S. N.*

Epileptic Seizure Patterns, A Study of the Localizing Value of Initial Phenomena in Focal Cortical Seizures, by *Wilder Penfield,* C. M. G., M. D., D. Sc., F. R. C. S., F. R. S., Professor of Neurology and Neurosurgery, McGill University; Director, Montreal Neurological Institute, Montreal, Canada, and *Kristian Kristiansen,* M. D., Assistant Surgeon, in charge Neurosurgery, Oslo City Hospital, Oslo, Norway; Formerly, Research Fellow, Montreal Neurological Institute, Montreal, Canada. 104 pages; illustrated. Charles C Thomas Publisher, Springfield, Ill., 1951. Price $3.

This monograph emphasizes the fact that analysis of the initial phenomenon or aura in an epileptic attack makes it possible to predict the localization of the focus in the cerebral cortex. The aura may be sensory, motor, psychical, autonomic motor and sensory, or a sudden loss of consciousness. Following the initial phenomenon there may be a grand mal seizure, but this latter has no localizing value. Only those patients with presumed focal cortical seizures are discussed; 259 patients were analyzed regarding the initial phenomenon of their attacks. Cortical exposure was performed on all patients. The majority had preoperative electroencephalograms and many had electrocorticography during operation. Thirty-seven patients were eliminated from the study because the localization of the origin of the initial discharge

was in doubt; 222 patients at operation showed evidence of localization, either by reproducing the aura or initial symptom by cortical stimulation, by gross pathologic evidence associated with electroencephalographic evidence of a spike focus, by gross pathologic changes alone, or by electroencephalographic evidence only. Of these, 122 had atrophic cortical lesions with meningeal adhesions, 37 had tumors, 18 had simple atrophic lesions of the cortex, and 17 had miscellaneous pathologic conditions. In 28 patients the nature of the pathologic lesion was not determined. The initial phenomenon of each patient was correlated with the findings on cortical exposure. A brief summarizing chart is presented, setting forth the correlation of different types of initial phenomenon with specific cortical areas.

This monograph throws further light on the functions of the various areas of the cerebral cortex. It points out that an aura, if analyzed accurately, has localizing value in most patients. It recommends in those patients with localizing aura followed by grand mal seizures that a diagnosis of focal cortical seizures be made, reserving the term epilepsy for those in whom no brain lesion or cortical focus can be demonstrated, the EEG showing bilateral 3–sec. synchronous waves of electrical potential. Neurosurgical procedures are not unduly emphasized nor are such studies as roentgenograms, pneumoencephalograms, and angiograms disparaged. This monograph is recommended to all who deal with epilepsy, including the general practitioner. Aura analysis may lead to a life-saving early removal of a cortical tumor. The physician will be reminded that a complaint of a feeling of unreality may be due to pathologic changes in a temporal lobe.

—*Lt. Col. J. W. Sumner, Jr., MC, U. S. A.*

The 1951 Year Book of Medicine (May 1950-May 1951), edited by *Paul B. Beeson*, M. D.; *J. Burns Amberson*, M. D.; *William B. Castle*, M. D., S. M. (Hon.) Yale, M. D., (Hon.) Utrecht; *Tinsley R. Harrison*, M. D.; and *George B. Eusterman*, M. D. 696 pages; illustrated. The Year Book Publishers, Chicago, Ill., 1951. Price $5.

For a concise coverage of the significant literature relative to the field of internal medicine this Year Book is particularly recommended. The editors have done a good job in including abstracts of representative articles reflecting accurately recent advances and contributions. It is felt that if the contents of this book are digested the reader will have enhanced his knowledge and certainly made a sizeable effort at keeping abreast of the field. The index gives leads for more exhaustive reading in regard to the case at hand. A most practical method of using the Year Book is to read such abstracts as are pertinent to the patients currently being treated by the reader. The usual subspecialty division is made to include (1) infections, (2) the chest, (3) the blood and blood-forming organs, (4) the heart, blood vessels, and kidney, and (5) the digestive system.—*Commander J. B. MacGregor, MC, U. S. N.*

Your Diabetes, A Complete Manual for Patients, by *Herbert Pollack,* M. D., Associate Physician for Metabolic Diseases, Mount Sinai Hospital, New York. *Marie V. Krause,* M. S., Consulting Dietician. Revised edition. 212 pages. Paul B. Hoeber, Inc., New York, N. Y., publisher, 1951. Price $3.

This book is a complete manual for diabetic patients and is designed to teach the patient what his disease is and what it means to him. The author emphasizes simplicity throughout the book, especially the manner in which a diabetic can maintain a normal way of life. The subject matter is presented in a very interesting way and the book makes delightful reading. The psychologic approach should aid in obtaining complete cooperation of the patient and relieves the doctor of explanations which are time-consuming. The various types of insulins and their actions are discussed as well as coma, insulin reactions, infections, care of the feet, and diet. The chapters on diet explain how the patient can cater to his racial dietary habits, and how to eat in a restaurant without being conspicuous. The method of calculation of diabetic diets and exchanges is simplified and explained thoroughly. This book is strongly recommended for all diabetic patients. All medical men who treat diabetics should be cognizant of the contents so that they can advise their patients of its availability.—*Commander E. P. McLarney, MC, U. S. N.*

Clinical Laboratory Diagnosis, by *Samuel A. Levinson,* M. S., M. D., Ph. D., Director of Laboratories, University of Illinois Research and Educational Hospitals, Chicago, Ill.; Professor of Pathology, University of Illinois College of Medicine, and *Robert P. MacFate,* Ch. E., M. S., Ph. D., Chief, Bureau of Laboratories, Department of Health, City of Chicago; Assistant Professor of Pathology, University of Illinois College of Medicine; Formerly Assistant Director of Laboratories, University of Illinois Research and Educational Hospitals, Chicago, Ill. 4th edition, thoroughly revised. 1146 pages; 221 illustrations, and 13 plates, 10 in color. Lea & Febiger, Philadelphia, Pa., publisher, 1951. Price $12.

The fourth edition of this book on laboratory procedures brings to the technician, student and clinical pathologist the significant recent advances in the field of clinical pathology. Since its first publication in 1937, this book has enjoyed a deserved popularity among laboratory workers. It covers a wide field including chapters on skin tests, metabolism, blood chemistry, hematology, bacteriology, milk and water analysis, tropical diseases, histologic technic, and legal medicine and toxicology. In addition to detailing procedures, the authors include interpretation of results and general considerations of the diseases to which the tests apply. The usefulness of the chemistry section is enhanced by a statement on the principle of each test, a subject neglected by most laboratory manuals. The chemistry section also includes a concise description of visual and photoelectric colorimetry methods which will assist the student in understanding the operation of these instruments.

The paragraphs on Rh have been rewritten and include a description of Coomb's test. Methods for eosinophil counts, the Lee-White method for determining coagulation time, the heparin-protamine titration procedure and tests for paroxysmal hemoglobinuria are among other additions to the chapter on hematology.

The chapter on bacteriology includes additional paragraphs on antibiotic sensitivity and assay tests and on technics used in mycology. The chapter on serology describes the Kolmer complement fixation test and the Kahn and Kline tests but no mention is made of technics employing the cardiolipin antigen used by the United States Public Health Service and the U. S. Army and Air Force.

The insulin test has been added under gastric analysis; tests for urobilinogen include a quantitative method; the sodium deprivation and galactose tolerance tests are included in the chapter on metabolism; and skin tests for chancroid, coccidioidomycosis, glanders, histoplasmosis, trichinosis, tularemia, and mumps have been added. The number of pages is increased from 971 to 1146 and of illustrations from 192 to 221. This volume can be recommended without reservations for all interested in the field of clinical pathology. It is full of information which will aid the laboratory worker in carrying out the diagnostic procedures required by the clinician and it will aid the clinician in the interpretation and evaluation of these procedures.

—*Col. H. R. Gilmore, Jr., MC, U. S. A.*

A Bio-Bibliography of Edward Jenner 1749-1823, by *W. R. Lefanu.* 179 pages; 29 plates. J. B. Lippincott Co., Philadelphia, Pa., publisher, 1951. Price $16.

The story of Edward Jenner and cowpox vaccination has been told in scores of biographic sketches and is well presented in full-length biographies that are still in print. This book, however, is not a biography in the usual sense. Neither is it exclusively a bibliography. It is a combination unique in the field of Jenneriana, providing an annotated and descriptive listing of all of Jenner's published writings, and presenting sufficient biographic material to give continuity and perspective to the list of publications. The book comprises a most complete guide to Jenner's writings. Not only are the works fully described and liberally abstracted, but the world-wide distribution of known library copies of each publication is given. This feature will be particularly valuable to researchers who desire access to source material. Although the author is unquestionably an admirer of Jenner, he does not permit this fact to color his treatment of the biographic material. The impartial presentation encourages the reader to base his opinion on Jenner's own writings rather than on the author's statements. The Father of Vaccination is seen as one of the truly great men of medicine, and also as a man whose versatile interests ranged from the composition of verses to the sampling of whale's milk, and included extensive contributions to ornithology. The book is beautifully printed and bound, and

contains many illustrations. The American edition is limited to 500 copies, which are numbered and boxed—a prize for any collector or student of Jenneriana.—*Capt. R. L. Ware, MC, U. S. N.*

Principles and Practice of Obstetrics, originally by *Joseph B. DeLee,* M. D., by *J. P. Greenhill,* M. D., Attending Obstetrician and Gynecologist, The Michael Reese Hospital; Obstetrician and Gynecologist, Associate Staff, the Chicago Lying-in Hospital; Attending Gynecologist, Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. 10th edition. 1120 pages; 1140 illustrations. W. B. Saunders Co., Philadelphia, Pa., publishers, 1951.

The presentation of a new edition of DeLee's great book is always an important event in the obstetrical world. Dr. Greenhill has carried on through several editions since Dr. DeLee's death, and now for the first time his name appears before that of Dr. DeLee. This edition is a decided change from the previous editions in that Dr. Greenhill has rewritten a great deal of its text and made some changes in format which add to the book's quality. It is easier to read and its ideas are more clearly presented.

This edition contains the fruits of a meeting between Doctors Eastman, Titus, and McCormick, who are also authors of obstetrical books, and they have reached an agreement on certain definitions, terms, classifications, and procedures so that the reader will not be confused in his reading of works from various medical centers. This new edition has a valuable chapter by Dr. Deutsch on the psychology of pregnancy, labor and the puerperium, a subject frequently treated in the lay literature.

Although this book is encyclopedic and should be of value to students, practitioners, and specialists, there is room for improvement. The chapter on asphyxia neonatorum needs better illustrations. Figure 652 showing Flagg's apparatus pictures a carbon dioxide tank which I believe is antiquated. I was rather surprised to see so much writing and so many illustrations still devoted to the metreurynter in the treatment of placenta previa. Many of the residents and recent graduates with whom I have been associated had never seen the bag used. Most discussions now days have relegated the bag to antiquity. The repair of an episiotomy as presented appears rather complicated, and only a few clinics at present use silkworm-gut sutures as they are illustrated. The illustrations are of the unusual situation and can be accepted for a hurried emergency closure of an episiotomy or in the treatment of a hematoma complicating an episiotomy, but for the ordinary repair, the method illustrated is seldom used.

The chapter on x-ray pelvimetry is weak. There is a need for illustrations revealing the proper positions of patients. In my experience, most difficulty has been in interpreting views improperly taken, and I do not like to expose these patients to so much x-ray in retaking the views, and in particular, the one of the superior strait. On page 225 in

the chapter on preparations for delivery in the home listing articles to be included in the obstetrical bag, I should think that instead of pituitary extract, alphahypophamine should be listed; the size of the ampules of 50 percent magnesium sulfate should be stated; bichloride of mercury tablets are seldom, if ever, used; syrettes of morphine would be easier to use than the tablets; breast binders are seldom used and are unnatural (a good brassière is much better); and, finally, there is no mention of a bulb syringe, which is excellent for aspirating the baby's pharynx.—*Lt. Col. S. L. Avner, MC, U. S. A.*

Essentials of Pharmacology, by *Frances K. Oldham,* Ph. D., M. D., Research Associate in Pharmacology, University of Chicago; *F. E. Kelsey,* Ph. D., Associate Professor of Pharmacology, University of Chicago; and *E. M. K. Geiling,* Ph. D., M. D., Frank P. Hixon Distinguished Service Professor, and Chairman of the Department of Pharmacology, University of Chicago. 2d edition. 462 pages. J. B. Lippincott Co., Philadelphia, Pa., publishers, 1951.

This book, according to the preface to the first edition, is designed for use as an introductory text in pharmacology. It has been made as brief as possible, and it covers the field well for so short a presentation. The general classes of drugs are discussed adequately, but the value of the text might be increased by inclusion of a larger number of drugs. It has apparently been the aim of the authors and publishers to make this text inexpensive as well as brief. The binding is very flimsy for a book which is to be in constant use in study and the narrowness of the margins gives the pages a crowded appearance that distracts the eye and makes assimilation of the contents more difficult. Within its own set limitations, this book gives a satisfactory presentation of its subject.—*Commander R. L. Taylor, MSC, U. S. N.*

The Approach to Cardiology, by *Crighton Bramwell,* M. A., M. D., F. R. C. P., Professor of Cardiology in the University of Manchester; Physician to the Manchester Royal Infirmary; Formerly Professor of Systematic Medicine in the University of Manchester; Senior Censor of the Royal College of Physicians of London; Examiner in Medicine to the University of Cambridge, Edinburgh, Durham, Aberdeen, and Sheffield, with a foreword by *A. V. Hill,* C. H., O. B. E., Sc. D., F. R. S., Foulerton Research Professor of the Royal Society. 122 pages; illustrated. Oxford University Press, New York, N. Y., publisher, 1951. Price $3.75.

This short monograph consists essentially of a series of introductory lectures presented to students at the University of Manchester by the author. These lectures, a part of the series in medicine, are designed to illustrate the application of the preclinical sciences to cardiology. The contents reflect many of the personal contributions of this eminent cardiologist to the field of physiology and clinical medicine. This book is in no way a text in cardiology as the material presented scarcely covers the fundamental and general principles of cardiology. The author's manner of presentation and clarity of illustration are noteworthy, especially his explanations of the factors in the production of valvular murmurs and pulse formation. While much factual and prac-

tical clinical information is briefly presented, this is elementary in character and limited and superficial in scope. The material is excellent for the purpose for which it is intended. This monograph is only recommended, as the title implies, as an introduction to cardiology for the unexperienced student or clinician.—*Col. T. W. Mattingly, MC, U. S. A.*

Visceral Innervation and Its Relation to Personality, by *Albert Kuntz,* M. D., Ph. D., Professor of Anatomy, St. Louis University School of Medicine, St. Louis, Mo. American Lecture Series Publication No. 115, A Monograph in American Lectures in Anatomy. 152 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1951. Price $4.50.

The author succeeds in presenting a detailed description of the anatomy and a brief summary of the physiology of the autonomic nervous system, including its central connections. The final chapter, entitled "Visceral Neural Factors in Personality," correlates the autonomic nervous system with the intellect, including their integration in such areas as the hypothalamus and rhinencephalon which result in influences on personality, emotional behavior, and visceral regulation. Most of the emphasis in this chapter, and throughout the book, however, is placed on anatomic rather than physiologic data, and the last paragraphs give an Aristotelian attempt to use emotions, through a hierarchy of intellect over viscera, as a means to a greater appreciation of ethical values.

The book contains an up-to-date bibliography; one-quarter of its references are to literature of the past 3 years. Its format is excellent and special mention should be made of its many fine illustrations. The price is excessive considering its small size. The book is authoritative and useful but because most of its information is available in standard textbooks of physiology this monograph serves no useful purpose. The author's viewpoint is not that of the doctor at the bedside, but rather of the doctor in the laboratory.—*Col. R. P. Johnson, MC, U. S. A.*

Cancer Cytology of the Uterus, Introducing a Concept of Cervical Cell Pathology, by *J. Ernest Ayre,* M. D., Director, Dade County Cancer Institute, Cancer Cytology Center; and Chief, Cancer Research Department, Medical Research Foundation of Dade County, Miami, Florida; Formerly Director, Cytological Laboratories, Donner Building for Medical Research; and Lecturer in Gynecology and Obstetrics, McGill University; Associate Gynecologist and Obstetrician, Royal Victoria Hospital, Montreal. 407 pages; illustrated. Grune & Stratton, New York, N. Y. publisher, 1951. Price $14.50.

This monograph describes and illustrates in a comprehensive manner the diverse cytologic phenomena which the author has observed in his extensive studies of normal and abnormal conditions in gynecology. The format is excellent. There are numerous colored plates as well as black and white photomicrographs. The orderly arrangement and classification of lesions makes for clarity. The author enthusiastically advocates the cytologic method for both early diagnosis and investigation of pathologic processes but recognizes its limitations and the necessity for

properly correlating the clinical and histologic findings. Many of his patients have been followed for relatively long periods by both clinical and cytologic studies.

Attention is invited repeatedly to the important squamocolumnar junction of the cervix as the site of origin for both neoplastic and nonneoplastic disease. The author describes clearly and in detail his technic of obtaining specimens for cytologic study and presents convincing evidence of its superiority over other methods. His technic includes, in addition to the cervical secretions, a scraping of the entire circumference of the squamocolumnar junction. This is termed "surface cell biopsy." It is stated that better preserved and more representative, concentrated specimens are obtained without removal or destruction of tissue which would preclude further observation. In the absence of definite in situ carcinoma or invasive carcinoma of the cervix, which require definitive treatment, this comprehensive and atraumatic method is recommended for serial study to determine the fate of abnormal cells as a guide for both clinical treatment and research.

The description of normal cytologic findings in relation to the pregnant and the nonpregnant state, is followed by the abnormal changes which are classified as inflammatory, "nearo-carcinoma," noninvasive and invasive epidermoid carcinoma. On serial studies the inflammatory changes have been found to be reversible, but the cell changes in "nearo-carcinoma" and carcinoma in situ persist or progress to a more "anaplastic" state. "Nearo-carcinoma," employed as an alternative term for the precancerous stage, will probably remain a controversial subject. Some of the illustrations of cervical tissue sections presented as showing definite carcinoma are open to question. The author may not appreciate that rapidly proliferating or actively metabolic benign cells will simulate morphologically malignant cells.

In view of the increasing interest in exfoliative cytology in the past decade, this book is a timely and excellent presentation of the author's studies. The clinician should be stimulated to employ the cytologic method. This monograph should be a valuable text for the pathologist, cytologist, and laboratory technician.

—*Commander E. B. Hopper, MC, U. S. N.*

Tonsil And Allied Problems, by *Roy H. Parkinson,* M. D., F. A. C. S., Chief of Eye, Ear, Nose, and Throat Department, St. Joseph's Hospital, San Francisco, Calif. 432 pages; illustrated. The Macmillan Co., New York, N. Y., publisher, 1951. Price $12.

Dr. Parkinson has done an excellent job in writing an entirely new book dealing with the tonsil and its related problems. Although the book is well written from the standpoint of the general practitioner, its greatest value will be to those practicing otolaryngology. The author gives a fine review of the anatomy of the tonsil and its adjoining structures. He discusses briefly the potential spaces around the tonsils, which are often omitted or inadequately described in similar texts. I was particular-

ly interested in the following statement on page 148: "Dingle and his co-workers stress the fact that all causes of exudative tonsillitis and pharyngitis are not due to streptococci. These observers have very frequently seen cases of acute follicular tonsils due to staphylococci. Dingle also points out that in their investigations at the Fort Bragg Hospital a large number of cases of acute follicular tonsillitis were seen in which the cause could not be found." I have had the same experience as Dr. Dingle in the last 3 years at the hospital mentioned.

Dr. Parkinson emphasizes the atraumatic technic in tonsillectomy, especially when dealing with chronic inflammatory diseases of the tonsils. He describes his method which should help many otolaryngologists in improving their own technic. The author does not advocate tonsillectomy as a cure-all, but places proper emphasis on the tonsils as a focus of infection and recommends a thorough and proper evaluation in the elimination of such foci. In chapter 16 the author covers the indications and contraindications for tonsillectomy. He advocates radiation of the spleen to increase the coagulability of the blood. He also describes the technic employed and gives sufficient reference should one desire to investigate this further.

I heartily agree with his statement that "the ideal result of tonsillectomy would be one in which a year after operation the pharynx appears to be as if the patient were born without tonsils."

—*Col. S. L. Cooke, MC, U. S. A.*

Atlas of Cross Section Anatomy of the Brain, Guide to the Study of the Morphology and Fiber Tracts of the Human Brain. Fifth Section of Emil Villiger's Brain and Spinal Cord, 14th edition. Revised by *Eugen Ludwig*, Professor of Anatomy, University of Basel; Atlas further revised by *A. T. Rasmussen*, Professor of Anatomy, University of Minnesota. 63 plates. The Blakiston Co., Philadelphia, Pa., publishers, 1951. Price $5.50.

This atlas supplies a long felt need for a series of brain sections arranged and compiled for quick reference. The full-page drawings are executed from exceptional preparations in the anatomic collections of the University of Basel and the University of Minnesota. Each sketch is complete as to major structures only, thus the reader is spared the many minor and irrelevant labels which might discourage and confuse him. Artistic license and a fine degree of tone and texture have been blended carefully in emphasizing the major tracts, which are often not clearly delineated in the original preparations. The book is divided into 3 parts. The first is a transverse series from the lower medulla to the upper midbrain; the second is a frontal series through the upper brain stem and cerebral hemispheres; and the third is a parasagittal series through the cerebral hemisphere. It is hoped that in future editions a small section of horizontal cuts at the level of the internal capsule and corpus striatum will be included in order to give a third dimensional aspect to the study. This book should be of particular value to those preparing for examinations in the structure of the central nervous system.—*Lt. Col. Stephen Mourat, MC, U. S. A*

Surgical Practice of the Lahey Clinic, by Members of the Staff of the Lahey Clinic, Boston. 1,014 pages; 784 illustrations on 509 figures. W. B. Saunders Co., Philadelphia, Pa., publisher, 1951. Price $15.

This volume, written in understandable English, brings the vast surgical experience of an outstanding clinic to the reader in usable form. Any surgeon, regardless of his experience, can profit by reading it. The preoperative technics employed, postoperative care, and the results obtained by the many contributors, all recognized authorities, enhance the value of this volume. The volume is divided into 11 sections and in these sections the major surgical problems commonly encountered are skillfully covered. The reader is guided systematically through the steps in the management of the patient which have served the author so well. Ample explanation is given as to why certain things are done, why certain procedures are avoided and how these procedures are carried out by acknowledged masters in their field. Many specialized fields in surgery with which I am relatively unfamiliar are presented in clear, easily readable sections.

—*Col. J. E. Graham, MC, U. S. A.*

Physical Diagnosis, by *Raymond W. Brust,* A. B., M. D., F. A. C. P., Associate in Medicine, University of Pennsylvania Medical School. Introduction by *Truman G. Schnabel,* A. B., M. D., F. A. C. P. 294 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y. publisher, 1951. Price $4.50.

One may at first ask, "Why another book on physical diagnosis?" A perusal of this little book quickly answers the question. First, there is a wealth of material on physical diagnosis, presented systematically, beginning with the head and proceeding downward and inward. Second, it does not contain sections on roentgenology, electrocardiography, and other methods involving the use of precision instruments which unnecessarily clutter up other volumes on physical diagnosis. Such sections are inadequate and therefore of no practical help. Third, this book is pleasant to read. Throughout its pages the author presents relevant detail, stresses signs of practical importance, and distinguishes what is common from what is rare. As a result, this little book offers a thorough grounding in the art of physical diagnosis. The index is adequate. It is highly recommended.

—*Commander M. T. Yates, MC, U. S. N.*

U. S. GOVERNMENT PRINTING OFFICE : O—1952